The publisher, as in past years, has always insisted on writing his own Christmas Greeting to the readers and advertisers of TELEPHONE ENGINEER. This year is no exception.

"Goodwill Toward Men" is, at the present time, a slightly frayed message worn thin and bare by untoward incidents in this great old world of ours. We have always included the world at large in our Christmas Message and regardless of acceptance this year in

some portions we repeat that Greeting to those who care to accept.

To our subscribers who read our unworthy efforts, our heart is full of Christmas Joy that the telephone industry has made much progress during 1938.

To our advertisers we salute and thank you for your assistance in making TELEPHONE ENGINEER a dominant magazine to serve telephony everywhere.

And to you both, A Merry Christmas, and a Most Prosperous 1939.

J. A. SMITH

TELEPHONE ENGINEER

MANAGEMENT · ENGINEERING · MAINTENANCE

Vol. 42, No. 12 **December, 1938**

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Published Monthly by

Telephone Engineer Publishing Company

A Magazine devoted to the interests of the entire telephone industry—operating men and manufacturers.

SERVING THE FIVE BILLION DOLLAR TELEPHONE INDUSTRY

Founded in 1909

Office of Publication, Pontiac, Illinois. Executive and Editorial Offices 185 N. Wabash, Chicago, Illinois. Phone Franklin 4094. J. A. SMITH, President and Treasurer; RAY W. SMITH Vice-President and Editor; L. M. BERRY, Vice-President; D. WEINER, Secretary Subscriptions: U. S., Cuba, Mexico, $1.00 Per Year; Canada, $1.50; In all Other Countries, $3.00. Single Copies, U. S. A., 15 cents.

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TELEPHONE ENGINEER
MANAGEMENT · ENGINEERING · MAINTENANCE

DECEMBER, 1938

"Tapping In" On Washington

The proposal by the Bell System in a 280-page brief to the FCC that it reject the Proposed Telephone Investigation Report of Commissioner Paul A. Walker as the basis for its final report to Congress and the legal interpretation of the Wages-Hours Administration that telephone companies could not be classed as "service establishments" for exemption from the minimum wage and maximum hours standards formed two highly important developments for the telephone industry in the deliberations of the Federal government during early December.

Both developments will undoubtedly result in further significant consequences during the next several weeks which may lay down, in the case of the Wages-Hours Act, important governmental policies.

BECAUSE the Walker Proposed Report was founded on an "unfair" investigation with ex-parte hearings and contained errors, misstatements, unjustified inferences and unsupported conclusions, the Bell System in its brief expressed the view the FCC should decide "that the Walker Report cannot properly be used in whole or in part as the Report the Commission will make to Congress." The Bell System Companies in their brief stated that the legislative recommendations of the Walker Report were unsound and in many cases would be detrimental to the telephone service, while in several instances "distinctly dangerous" and in one striking proposal "so far reaching as to be revolutionary in the field of regulation." The brief noted that the most dangerous and revolutionary recommendation was that to give the FCC the power to review, approve or disapprove the management policies of the Bell System which would create a super-board of directors and would destroy in large measure the regulatory powers of state commissions.

FOR the Independent Telephone industry, the most important event from the National Capital was the legal interpretation by the Wages-Hours Administration of the scope of the exemptions of Section 13 (a) (2) of the Fair Labor Standards Act. This Interpretative Bulletin by the Wages-Hours General Counsel took the position that while the telephone companies performed "services" they were not sufficiently similar in character to retail establishments to be considered "service establishments" which are designated for exemption from minimum wages and maximum hours under that section of the statute. *The Interpretative Bulletin, however, left an apparent opportunity for further definite determination of "service" industries, including the telephone companies, so that they could contain possible subclassifications of exchanges and operations such as contract agency operators as an outstanding example for later exemption.* The United States Independent Telephone Association had filed with the Wages-Hours Administration a brief which had depicted the threat of substantial curtailment of employment and even service among small rural companies and four Association officials—B. L. Fisher, president, John H. Agee, former president, E. C. Blomeyer, director, and Alfred L. Geiger, general attorney—had had a lengthy conference with leading Administration officials on the problems of the Independent industry. (See page 19 this issue.)

By ROLAND C. DAVIES
Editor
Telecommunications Reports

Difficult to Forecast Next Turn of Events

What will be the next turn of events in the FCC's formulation of its final Telephone Investigation Report to Congress and in the Wages-Hours Administration's determination of the status of the Independent Telephone industry under the Fair Labor Standards Act is difficult to forecast in either case.

● The Bell System brief has placed upon the FCC a very difficult task in

the formulation of the Final Report, because it showed that the Telephone Investigation evidence and the Walker Report's context and conclusions were so ex-parte as to cast doubt on the reliability of their facts and recommendations. The FCC undoubtedly will have to draft a compromise report which will embody the phases of the Investigation that are less controversial in character than some of the more drastic assumptions and conclusions of the Walker Report because naturally the Commission will have to consider the expenditure of $1,500,000 for the Investigation to be accounted for to Congress. It might be a possibility that most, if not all, of the drastic legislative recommendations in the Walker Report may be scrapped in the Final FCC Report and the Commission thus "pass the buck" to Congress, merely transmitting the summary of the evidence gathered in the Investigation. It seems highly doubtful that the FCC can transmit its Final Report until Congress has been underway for a month or more due to its hard task.

THE brief of the Bell System companies would appear to have this substantial effect. Both during the Investigation and since the publication of the Walker Report, leading members of Congress were highly critical of the ex-parte procedure of the FCC Telephone Investigation. The brief sums up the effects of this one-sided procedure in clear-cut language so that Congress now has before it a full exposition of the Bell System's position. Then, too, the brief would seem to "kill" any introduction of the Walker Report into the present Anti-Monopoly inquiry being conducted by the Temporary National Economic Committee, headed by the able Senator O'Mahoney of Wyoming. Senator O'Mahoney has pledged a fair and constructive inquiry and with the shadow of doubt cast on the Walker Report in the Bell System brief it is certain that the Senator who is deemed to be conscientious and sincere would not permit the use of such a controverted report in his study.

The Independent Telephone industry may be able to obtain further clarification of its status under the Wages-Hours law through an additional brief which has been requested by that Administration and through later conferences. However, in view of the legal interpretation that the telephone companies are not "service establishments" it is considered a strong possibility that *a court test may have to be the final deciding factor.* A hearing before the Administration could be staged after an industry committee is appointed for the telephone industry, but that may take some time because of the limited present appropriations of the Wages-Hours Administration. After such a hearing a court test could be launched. But a quicker method would be to have a wage complaint brought against a telephone company and the case immediately commenced in the courts.

COMING CONVENTIONS

Minnesota Telephone Association, Hotel St. Paul, St. Paul, January 24, 25 and 26.

Texas Telephone Association, Baker Hotel, Dallas, March 22, 23 and 24.

Oklahoma Telephone Association, Oklahoma City, March 27 and 28.

Kansas Telephone Association, Municipal Auditorium, Junction City, March 30 and 31.

Nebraska Telephone Association, Lincoln Hotel, Lincoln, April 11 and 12.

Iowa Independent Telephone Association, Fort Des Moines Hotel, Des Moines, April 18, 19 and 20.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 25, 26 and 27.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 10 and 11.

New York State Telephone Association, Hotel Syracuse, Syracuse, May 23, 24, 25 and 26.

The Illinois Telephone Association, Pere-Marquette Hotel, Peoria, June 7 and 8.

FCC Investigation-Reorganization-Expansion of Toll Regulation

ASIDE from the filing of the Bell System brief on the Walker Report with the FCC and the Wages-Hours Interpretative Bulletin (No. 6) dealing with the Section 13 (a) (2) scope and the status of telephone companies, a number of other interesting news occurrences were created in Washington which held more than passing significance for the telephone industry. These included:

1. *The boiling up of the threat of a Congressional investigation of the FCC, particularly in the Senate.* Senator White of Maine, ranking Republican on the Senate Interstate Commerce Committee, is planning to renew his inquiry resolution which would have as its main purpose the "objective study" of revising the Communications Act to fit modern needs. While broadcasting subjects form major points of his resolution, Senator White who is regarded as the ablest observer in Congress of communications and radio is intensely interested in communications and feels that the FCC has neglected that phase of its work. It is expected that Senator White will be supported in his resolution by Senator Wheeler of Montana, Chairman of the Senate Interstate Commerce Committee which would conduct the investigation.

(Please turn to page 39)

MERLE THORPE in the editorial columns of his Nation's Business tells of a conversation with a swimming instructor who pointed out to him a difference in temperament between Americans and Europeans.

The instructor said, "A European group goes swimming for pleasure and decides to swim over to an island. They start out leisurely, talking to each other, looking at the clouds, enjoying themselves. Americans in the same spot yell, 'Last one to the island is a sissy!' Everybody jumps in, threshes to the island with a six-beat crawl, hauls himself up on the dock and pants, wow!"

Thorpe's comment was that perhaps this national trait explains our progress. We thrive on competition, not only in our play but in our work. American business men do it with shoes and ships and sealing wax, with steel and automobiles and piece goods. These games are not played in vacant lots or fine equipped gymnasiums. They are played daily across the counters and the office desks of the nation. They are actually not games at all — but jobs that have to be done. But Americans, by their enthusiasm, their ambitions, have made them games.

Salesmen like games just as much as anyone else. Put competition into their daily selling with a well planned sales contest. Turn to page 19 where Zenn Kaufman tells how the old story of the little red school house helps build sales.

By
A. E. DIETZ
Bell Telephone Laboratories

Magnetizing by Condenser Discharge

PERMANENT magnets are most easily magnetized by placing them between the poles of a powerful electromagnet. In some cases a strong permanent magnet may be used for this purpose. This latter method is commonly employed in magnetizing the ringer magnets at subscriber stations, and was described in Telephone Engineer for March, 1937. Frequently, however, the core to be magnetized is of such a shape that another magnet cannot be employed to provide the desired flux. Under these conditions it is necessary to place a temporary winding around the core, and then secure the desired magnetization by passing a heavy current through this winding.

The windings, of course, serve no useful purpose once the desired magnetization has been obtained, and must be removed before the magnet can be used. It is desirable, therefore, to wind only as few turns as possible, and to attain the needed ampereturns by using a very large current. Since magnetization takes place practically instantaneously, the duration of the magnetizing current is unimportant; and to reduce the cost of the process and the local heating of the core, it should be made as short as possible. One method that has been employed is to connect the coil through a fuse across the terminals of a high-voltage large-capacity battery. The very large current that passes through the winding blows the fuse in a small fraction of a second, but not before the core has been magnetized.

Large-capacity generators could also be used with this method of magnetization, but either a generator or a battery of the required capacity is expensive, and for only occasional use they would be uneconomical. To provide a less expensive source of current, a condenser magnetizer was recently developed. Four hundred electrolytic condensers, each of eight microfarad capacity, have been compactly arranged in a box about thirty inches on its longest side, as shown in Figure 1. The condensers, connected in parallel, provide a total capacity of 3200 microfarads, and are charged through a full-wave rectifier to a potential of 350 volts.

Since the magnetizing coil has both resistance and inductance, the discharge current of the condenser is usually an alternating one as shown by the solid line in Figure 2. It rises rapidly to a maximum value, decreases, becomes negative, and then oscillates back and forth with a steadily decreasing amplitude. Such a current would magnetize the core during the first half cycle, and then would partially demagnetize it during the next negative half cycle. At the termination of the discharge, although there would remain some magnetization in the core, it would be very slight compared to the desired value.

To make such a magnetizer perform satisfactorily, therefore, some means must be provided for eliminating this reversal of current. This could be done by using a resistance above a certain critical value, which would cause the discharge to be as indicated by the dotted line of Figure 2. The maximum value of current, however, would be much smaller because of the greater resistance, and as a result much of the advantage of this method of magnetizing would be lost.

The arrangement actually provided

Fig. 1—When the magnetizer is in use a flat insulating shelf fits over the tops of the condensers, and the core to be magnetized is placed on it.

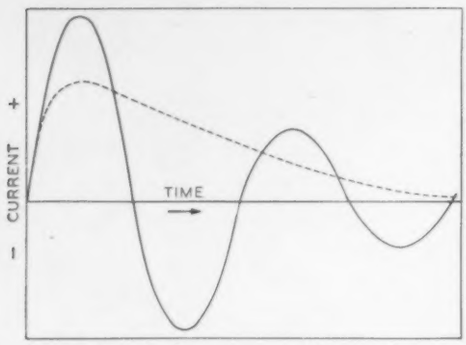


Fig. 2—The discharge current of a condenser into a circuit including a resistance and inductance oscillates from negative to positive with steadily decreasing amplitude.

avoids the difficulty by connecting an ignitron in the discharge circuit. This ignitron, which is an evacuated tube with mercury as one electrode, acts as a mercury-vapor rectifier—passing current in one direction only. With the ignitron in the circuit, the first positive half of the discharge is passed and then the circuit is opened so that no reverse current can flow.

A schematic diagram of the circuit employed is shown in Figure 3. In both positions the relay employed holds itself operated by the action of gravity; the operating current merely swings it from one side to the other. When the operating key is depressed, the relay swings to the opposite position and closes contacts 1 and 2. This connects the rectifier to the condenser which charges rapidly. When the operating key is released, the relay is swung to the other side and closes contacts 3 and 4. This applies the condenser potential to the very high-resistance ignitor electrode of the ignitron, and some of the mercury is vaporized to make the tube conducting. Current then flows to the magnetizing coil. As the current drops to zero at the end of the first half cycle, and starts to reverse, the tube ceases to conduct.

When the magnetizer is in use, an insulating shelf closes the box just above the condensers in Figure 1. Terminals A and B of Figure 3 pass through this shelf and terminate in heavy binding posts for connection to the coil, which is placed on the shelf. A coil is shown being connected in the photograph at the head of this article. The cover of the box is then lowered to prevent the operator from coming in contact with the high potential. The operating key projects through the front of the box. As a safety precaution the cover is arranged so that when lifted it opens switches in both sides of the circuit, not shown in Figure 3, and places a short-circuit across the condenser.

Currents as high as 4000 amperes have been passed by this magnetizer, but since their duration is only about a thousandth of a second, no serious heating occurs.

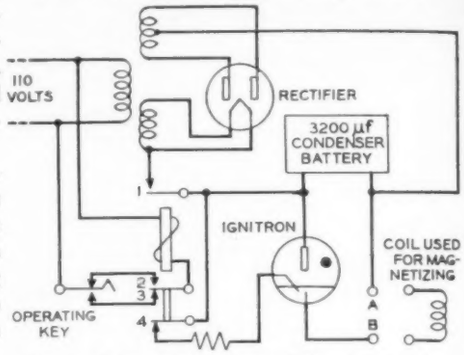
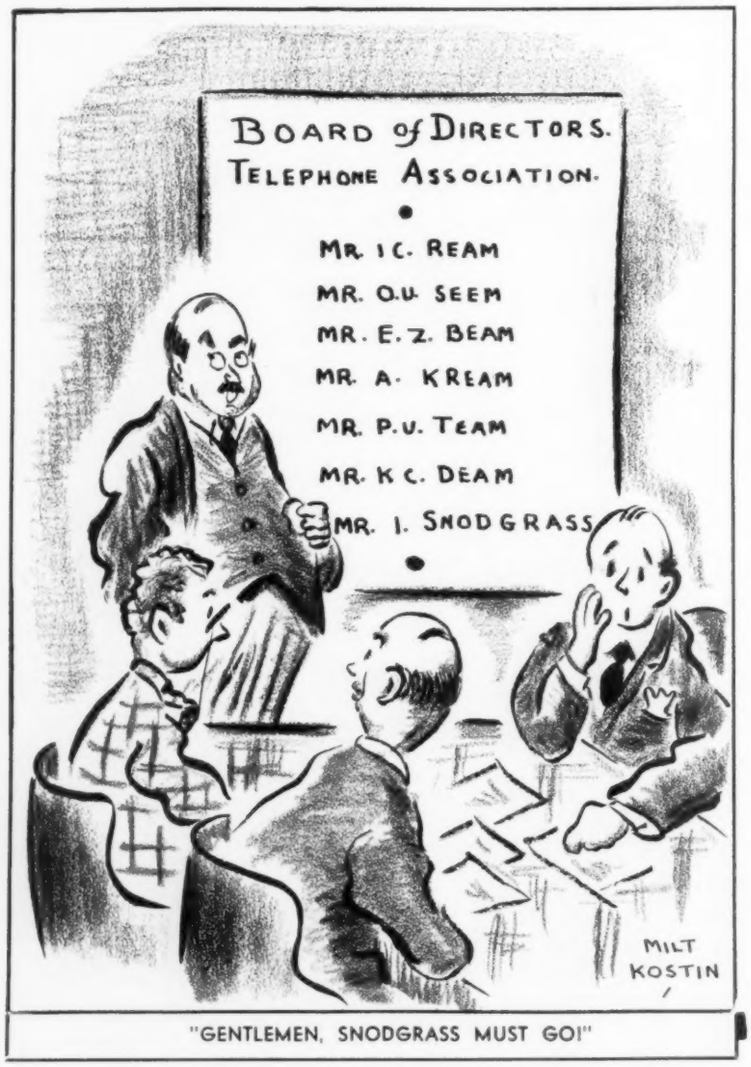


Fig. 3—Schematic diagram of the circuit used in the condenser magnetizer.

The apparatus has been found simple to operate, and it has simplified the magnetization of many types of cores that could not be magnetized with the permanent or electromagnet method.

END



"GENTLEMEN, SNODGRASS MUST GO!"

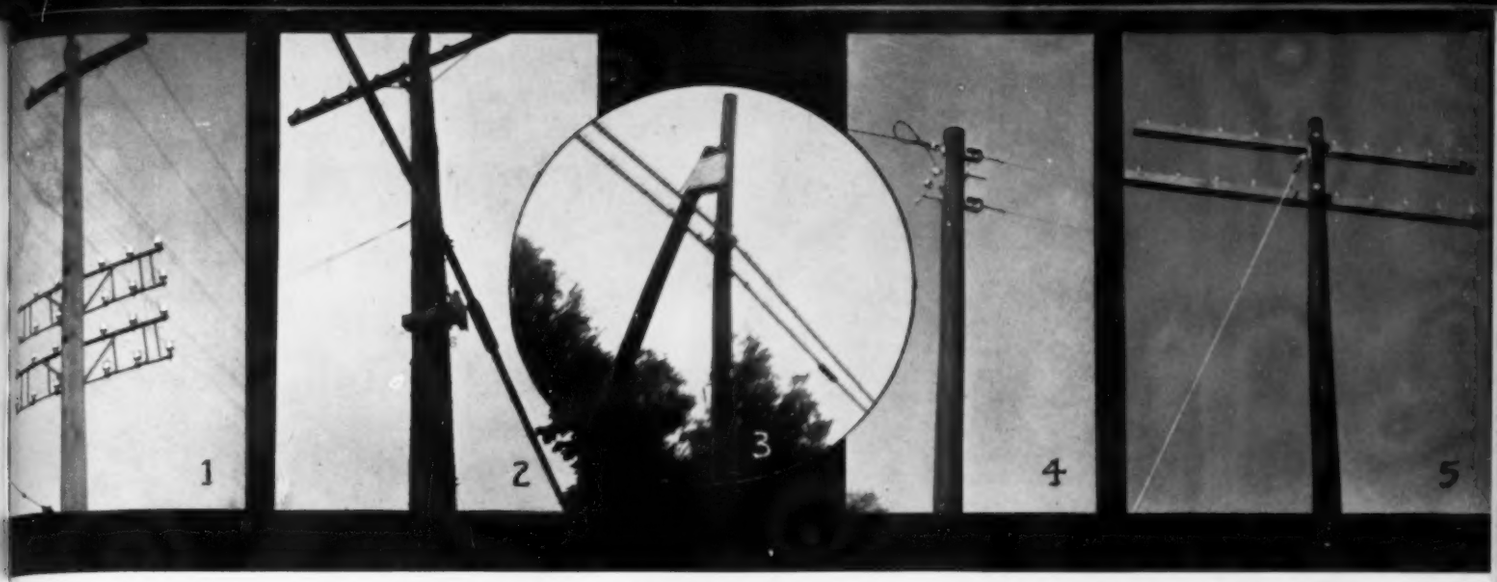
Bell Executive Honored

Dr. William H. Harrison, vice-president and chief engineer of the American Telephone and Telegraph Company and a past president of the American Institute of Electrical Engineers, has been elected a member of the Corporation of the Polytechnic Institute of Brooklyn, according to an announcement by Charles E. Potts, chairman of the corporation.

Alfred F. Lichtenstein, president of the Ciba Company of New York and Switzerland and Dr. Harry S. Rogers, president of the Polytechnic since 1933, also were elected to the corporation.

Chas. C. Mahan Dies Suddenly

Word has just been received, as we go to press, of the death of Chas. C. Mahan, 54, vice-president and general sales manager of the National Telephone Supply Co., Cleveland. This will be a distinct shock to his many friends in the telephone industry. Death came suddenly the evening of Dec. 9, at his home in Gates Mills, Ohio.

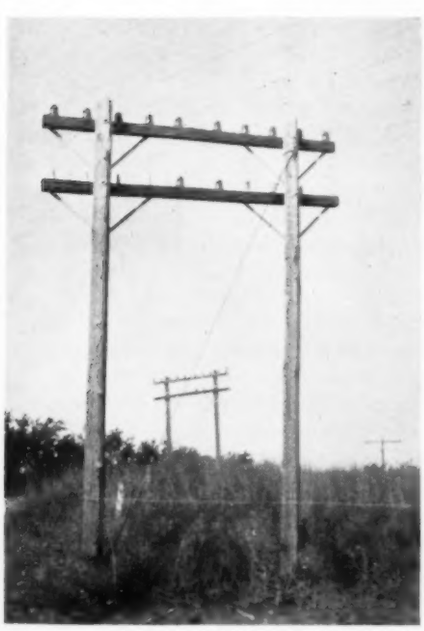


1. Angle iron crossarms, a neat job. 2. An unprotected cable terminal, with protection evidently added as an afterthought. 3. The "A" fixture is also being used frequently on cable construction. Note the triangular iron plates used to join the poles at the top. 4. A new idea in the deadening of open wire. Special fixtures used. 5. The eye bolt method of attaching guys to poles is now extensively used, even on rural lines.

Recent Changes in Construction Methods

By RAY BLAIN

DURING the past three months we have traveled over seven thousand miles in an automobile through fifteen states of our country and naturally observed all telephone plants along the way. Our observations indicates that outside plant construction is at the present time in one of the periods of greatest change in the history of the industry. Not only are new materials being developed and field tested but new and sometimes revolutionary methods of construction are likewise being tried in many sections of the country.



The H fixture with one guy is proving quite popular for corner construction.

We do not claim that change in all cases means progress and that the old is all wrong but we do believe that new ideas should always be given a chance to prove their worth. The cost of trying a new idea costs little ordinarily even when they fail and when they prove a betterment the saving realized from their adoption often represents real money. The general idea of experimentation which seems to have seized our industry we believe will eventually react to the general benefit of all. No doubt but that the development of the telephone industry, during the next few years will be rapid due to the present experimental attitude.

SOME may ask what can be accomplished and what benefit may be anticipated from this expected change. It is our honest opinion that we may develop less expensive construction methods, longer plant life and lower maintenance costs. On some types of plant higher construction costs may even be defended to provide longer plant life with less maintenance and fewer service interruptions. Telephone service of the future no doubt must above all be reliable and practically free of interruptions. We

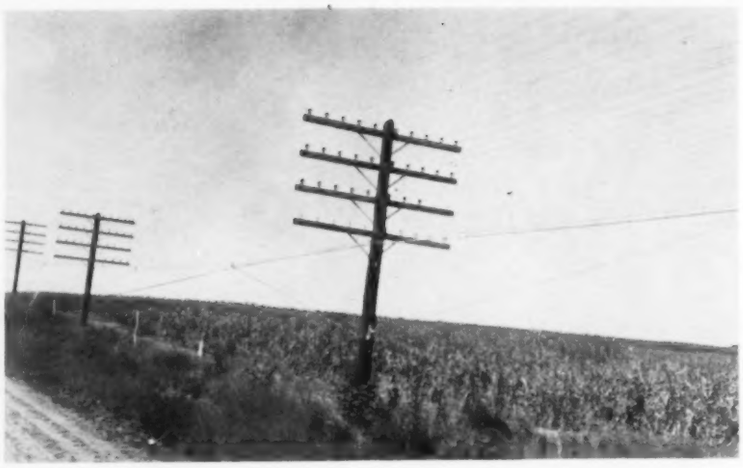
A study in corners. The single arm lead had the pole raked properly and well guyed. The two arm lead did not have proper rake or guys so consequently did not hold.

firmly believe that within the next few years we will all realize that we may have made real progress toward this goal.

We note of late more careful selection of poles better suited to each particular job. While a proper safety factor in pole strength is always desired, costs will not permit the use of poles with a strength greatly in excess of that actually required. Also special pole arrangements such as "A" and "H" fixtures are coming into more general use. This, we consider an excellent idea because when greater strength is required, rather than set an extra large pole, the use of two smaller ones, properly trussed, proved more economical and often provides even greater strength than can possibly be obtained with a single pole.

The "A" fixture is also often used on cable construction to provide greater strength in the line at certain points. Special triangular iron plates are sometimes used with bolts or lag screws to fasten the poles together at the top. This provides both a neat, and we believe, a most satisfactory arrangement.

OUT in the middle west we recently viewed an open wire line using concrete poles. This line has no doubt been installed as an experiment. The general opinion prevails that concrete poles will never prove desirable due to their cost, weight and difficulty in handling and climbing, and in this we are inclined to agree. However, the continued experimenting with them is interesting, and who knows, but that it may possibly yet lead to something worthwhile.



Center of a cable span anchored back to each pole to prevent vibration in the span.

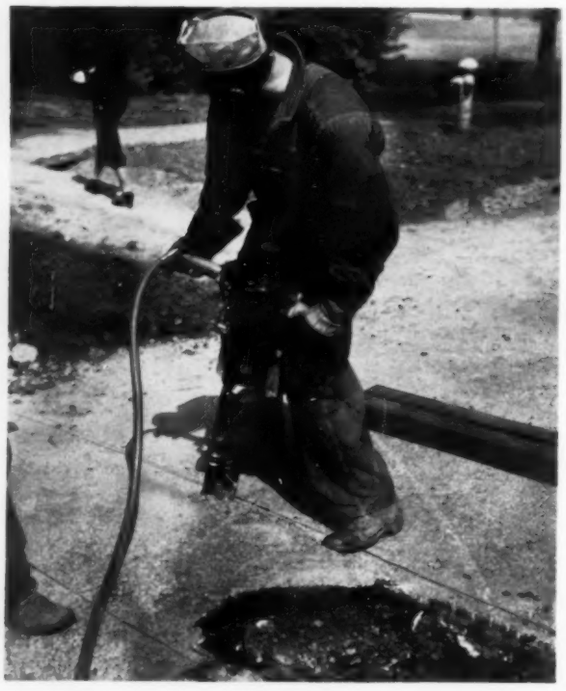
The routing of pole lines in general we note is being improved by exercising better judgment in line engineering. When roads are regraded and widened it has been common practice to move the line up to the top of the cut which provides both a poor grade for the line and exposes it to the full fury of the elements. Now in almost countless cases the pole line has been installed on the side of the cut a few feet from the pavement edge. This provides an excellent grade for the line and permits easy coverage when clearing line trouble.

Push braces are now being used quite extensively in some sections of the country when space will not permit the use of other guying methods. This brace was commonly used in the old days, then for a long period of time it practically went out of the picture. The triangle iron plates mentioned above are also sometimes used in the attachment of the push brace to the main pole. We noted one job where a push brace held a pole in one direction and a guy in the other though we do not believe this method could in general be recommended. We are of the opinion that an "A" fixture would do a much better job in most cases and at a lower cost.

● The observance of better guying methods is noted everywhere and we consider this a real step forward. The need of good strong corners and guys just can't be over emphasized. Some claim that long span construction for rural lines by using the new high strength line wire will not prove satisfactory due to the fact that it will be impossible to hold the heavy strain on the corners. To us this seems ridiculous because the power companies have made use of long span construction for years with much heavier conductors than those used for telephone work and they have not experienced any special difficulty with the holding of either corners or anchors. However, they do always build good corners and then anchor them properly.

To design a satisfactory corner first select a good pole or poles of proper size and class. Rake it properly toward the anchor, and this is most important. Then select the type of anchor suited to soil conditions in your locality and make sure that it is set to proper depth. If the strain is excessive place two or more anchors and guys to provide the necessary factor of safety. We personally prefer to use the 8 ft. anchor rod on all guys. The recently developed dynamometer we believe will do much toward the design of good corners with adequate guying which will in all cases hold the strain and permit maximum life of the line with a minimum amount of trouble.

(Please turn to page 34)



A gasoline operated hammer drill is economical and unusually well suited for use by small exchanges.

Association Committees Debate Wage-Hour Interpretation

THE Executive and Wage-Hour Committees of the United States Independent Telephone Association met in Chicago on December 13 to consider the announcement made December 7 by Mr. Paul Sifton, Deputy Administrator of the Wage-Hour Division of the U. S. Department of Labor, that telephone companies come within the provisions of the Fair Labor Standards Act of 1938; the Independent telephone industry having suggested to the Wage-Hour Administration that telephone exchanges are exempt under Section 13 (a) (2) of the Act which provides for the exemption of "any employee engaged in any retail or service establishment, the greater part of whose selling or service is in intrastate commerce."

The Association believes the opinion announced by the office of the Wage-Hour Administrator is not in accord with a reasonable interpretation of the law and is now seeking another conference in the belief that when the entire situation is presented to the Administrator he will be convinced the small Independent companies are exempt from the operation of the Act.

The desire to pay wages comparable with other industries and to provide working conditions equal to those of other industries is just as inherent with the Independent telephone industry as with others, but working conditions in the small telephone exchanges are so different from those in most commercial or industrial organizations that the United States Independent Telephone Association feels justified in claiming recognition for these differences in occupation.

It is believed that the Wage-Hour Administration recognizes the plight of the small Independent telephone exchanges and this being so it is expected that the proposed conference between the Administrator and representatives of the Association will find a way to remove any doubt of their being subject to the Act.

Many hundreds of small exchanges are operated under contract, or as agency exchanges, and the Association has reason to believe that should these be declared to be under the Act that the Wage-Hour Administrator would hold that the actual time consumed in operating these exchanges will be considered the time worked. For instance, studies have shown that in many of these small exchanges as few as two to six hours a day of actual labor at the switchboard is required; at other times calls being answered in response to the emergency bell. Also in these exchanges, in connection with compensation to the operator the things furnished should be considered, such as house rent, light, heat, etc., on the basis of their reasonable value.

THE ASSOCIATION SUGGESTS THE FOLLOWING:

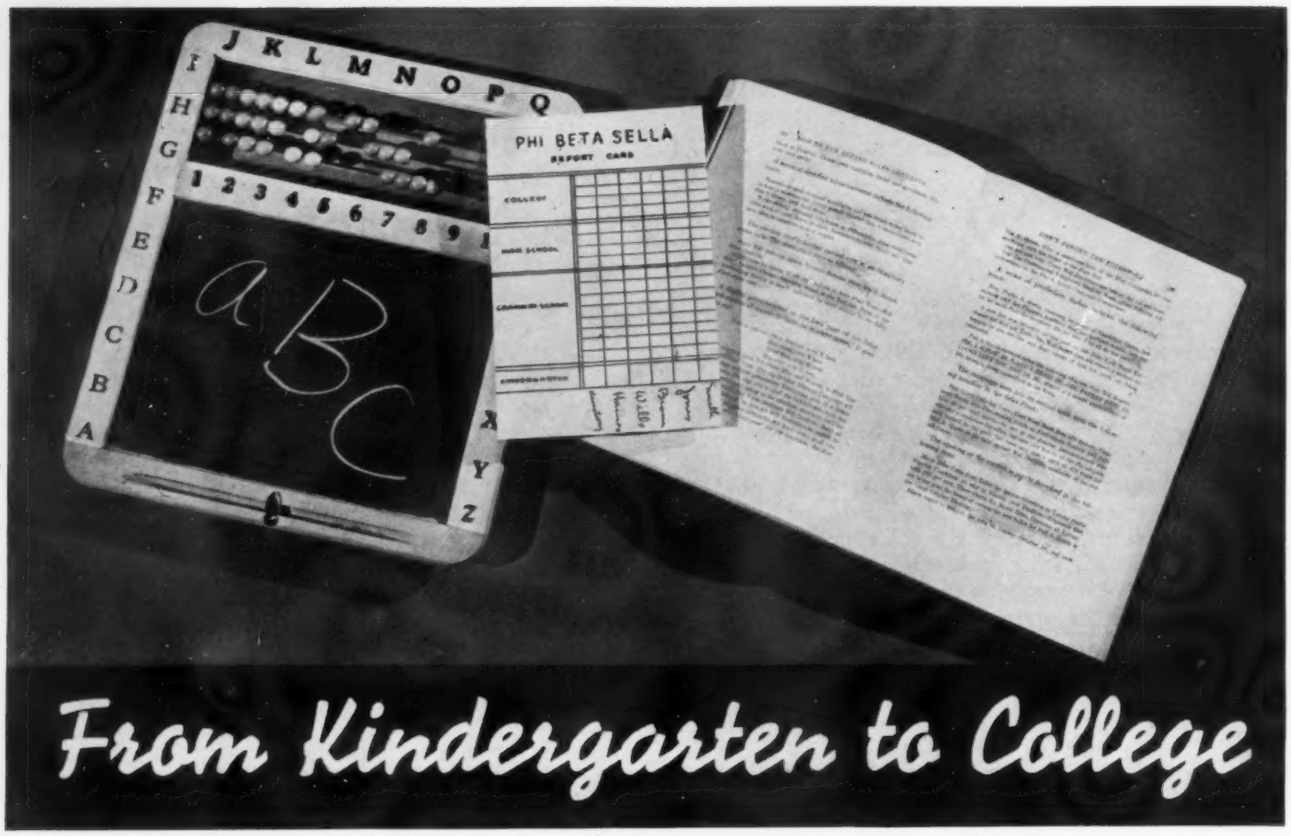
First, the management of every exchange should compute the time which the operator actually works at the switchboard. In computing wages due consideration should be made for rent, light, heat, etc., if properly part of the operator's compensation.

Second, it would advise the securing of rate increases, which in the majority of cases of small companies have long been needed.

Third, it recommends compliance with the 25c per hour, 44 hour per week provisions of the Wage-Hour Act on the part of all companies who find themselves financially able to do so.

Naturally, the future action of the Association will depend upon the outcome of the conference which its Wage-Hour Committee will have with the Administrator at Washington, and in the event a ruling or order is issued declaring the companies under the Act, a legal test of the application of the Act may be considered advisable, or the Association with the assistance of its member companies and the owners of the small Independent exchanges throughout the United States may endeavor to secure an amendment to the Act in the next Congress, convening in January, asking for an exemption similar to that given to the newspapers. Weekly and semi-weekly newspapers with less than 3,000 subscribers are exempt from the Act. Telephone companies with less than 3,000 subscribers should also be exempt.

(Note—TELEPHONE ENGINEER delayed publishing to bring you this report.)



A Ready-To-Run Sales Contest for Telephone Companies

By
ZENN KAUFMAN
author of
"How To Run Better Sales Contests"

SCHOOL days, school days, dear old golden rule days. Just a "tender" (?) memory to most of us but, believe it or not, a grand theme for your next sales contest.

Here's how it works. The employees start in kindergarten and progressively work their way up through grade school, high school and then college. If there was ever a contest that loaned itself to interesting lingo and patter, it's this School Daze contest. You can bring back all the fun of the old swimming hole by dealing out your sales story in terms of the language of the little red school house.

As Howard Brundage says, "One of the salesman's biggest assets is his smile, and this contest touches a little on the lighter side of our make-up, thus making our job much easier." He adds, "Let's all go back to our early school days and live our school life all over again." However, instead of difficult lessons to learn, we promote ourselves from grade to grade with the fun and thrill of signed orders. The solution of all problems is the signature on the dotted line, and instead of getting an A-plus on your papers, we get the actual money in our pockets in increased income.

Start at the bottom. All men start in kindergarten and stay there until they get 10% of their quota. Life just consists of cutting out paper dolls. Some fun!

THEN we really start to learn and travel upward through grammar school at the rate of one of the eight grades for each 5% quota. That means that when we graduate from grade school we have reached the half-way mark. Print your own McGuffy Reader, outlining the simple things that must be done to get business. For example: "This is a pig—it's okay for you to be a pig in sales—get all you can." Grammar school lessons include all the facts on how to prove to prospects that they should buy what you have to sell.

Next comes high school. Here the athletes begin to shine and men "go on the team" for sales ability. Each 5% covers one of the four years in school. Let the first half dozen men who get into high school divide into teams and play some simple game for a nominal prize. You supply the prize, of course.

(Please turn to page 36)

Review of Bell System Brief on the Walker Report

By
ROLAND C. DAVIES

THE FCC was asked to reject as the basis for its Final Telephone Investigation Report to Congress the Walker Proposed Report, not only because the latter was founded on ex-parte exhibits and testimony and distorted data and statements, but also because of its legislative recommendations, especially those advocating a usurpation of management responsibilities, would be detrimental and dangerous to the future telephone service of the nation and revolutionary in the field of regulation.

This was the important keynote of the 280-page brief of the Bell System Companies, filed with the FCC, in criticism of the Proposed Telephone Investigation Report of Commissioner Paul A. Walker, which right had been granted them by the Commission. In addition, the Bell System informed the FCC that it was compiling a huge supplemental brief of specific errors and misstatements in the Walker Report.

The brief was characterized to be "largely a statement of reasons which should, we submit, move the Commission to decide that the Walker Report cannot properly be used in whole or in part as the report of the Commission will make to Congress."

● The reasons were outlined as follows:

"(1) The investigation on which the Walker Report is based was, as a whole, unfair. The hearings were ex-parte, and the whole procedure was incapable of producing reliable conclusions.

"(2) The Walker Report is incorrect. To a large extent the allegations of fact and to a greater extent the inferences and conclusions drawn therefrom are not true. The Walker Report is full of errors in fact, misstatements of fact, and unjustified inferences and unsupported conclusions.

"(3) The Walker Report is incomplete. As to most subjects discussed, it does not contain the important facts in their proper setting, necessary to arrive at sound conclusions. It omits and disregards controlling facts which, if considered would compel different findings and conclusions. The facts presented are in a large measure separated from significant surrounding circumstances and distorted by improper emphasis.

"(4) The recommendations are unsound. Regardless of how the Walker Report was produced and regardless of what facts it alleges or conclusions it draws, its specific recommendations are not sound proposals for presentation to Congress. They are unnecessary; in most instances they would be detrimental to the telephone service; in several cases they are distinctly dangerous; and in one striking case, so far reaching as to be revolutionary in the field of regulation."

The brief stated that because of the ex-parte character of the record which supports the Walker Report, " we have considerable doubt as to the value of the kind of brief which the situation permits and certainly the brief can accomplish comparatively little to undo the injury we have suffered and will continue to suffer by reason of the wide publicity and apparent authority given to the reports of the investigators and to the Walker Report. The Walker Report has even been distributed to members of Congress, to State regulatory commissions, to the press, and to others, —all under an apparent official sponsorship of the Commission."

CITING that Congress in its resolution ordering the FCC Telephone Investigation directed the Commission to procure "accurate and comprehensive" information about the telephone industry for future intelligent regulation, the brief pointed out the belief that Congress was not desirous of information of the telephone industry's early history which had been delved into at length in the FCC Investigation and which has no significance in its present service. The brief then noted that the Walker Report, like the testimony and exhibits of its investigators upon which it rests, is largely a collection of criticisms.

"Criticisms have their place," the brief declared, "but neither criticisms nor the facts upon which criticisms rest,—even if the alleged facts supported the criticisms,—could be taken as compliance with the Congressional expectation of a 'thorough' investigation or with the Congressional direction to compile 'accurate and comprehensive' information. We show *** that criticisms expressed in the Walker Report

Next Month

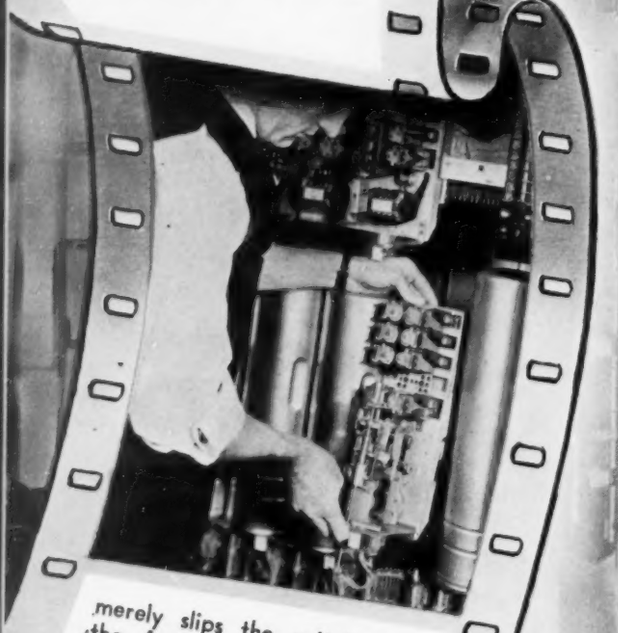
B. C. Burden

B. C. Burden, popular author of a series just completed in TELEPHONE ENGINEER, is now busy preparing a new feature entitled "Short Course in Telephone Transmission" which will deal with such subjects as *"Use of the Decibel", "Computation of Circuit Loss", "Crosstalk and Its Elimination", "Importance of Impedance Matching", "Repeating Coils and Their Uses", "Characteristics of Modern Telephone Apparatus", "Simplified Methods of Measuring Transmission Losses on Cable and Open Wire Circuits"*, Etc.

The material in this course is being prepared especially for Telephone Engineer Magazine. It will be written in a style that is interesting and easy to understand. The generous use of illustrations will help clarify complicated features of telephone transmission theory. It is hoped that every telephone man will take full advantage of this series.

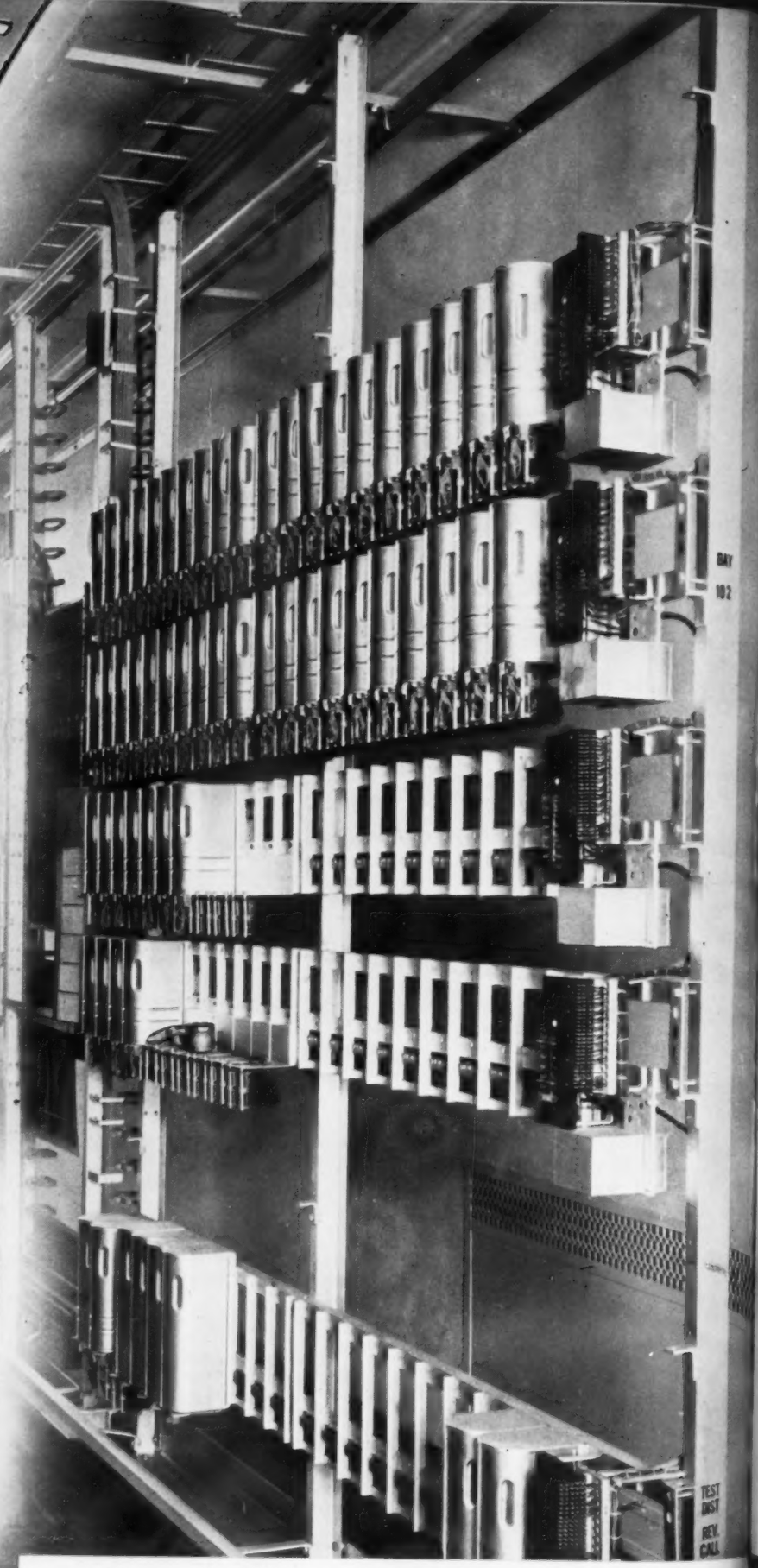
Be sure your subscription is paid up as this series will run in several installments.

To add any Strowger switch to an existing "shelf," the switchman—



merely slips the switch into the frame, where the jack springs automatically make connections,—

fastens the bank supports, adjusts the wipers and snaps the dust cover into place. The switch is then ready for duty.



A typical Strowger switch frame as it is furnished to provide for future expansion. All frame wiring is jack-ended at the factory, with additional portions provided with banks and bank wiring, ready for extra switches to be added as required.

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are not supported in fact and are, for the most part, mere assertions contrary to fact. That is not the point we are making here. We are here emphasizing that no mere collection of criticisms can be the kind of report which Congress directed the Commission to prepare.

"It is not our position, of course," the Bell System brief stated emphatically, "that no mistakes have ever been made by the Bell System companies. We do say that the charges of mistakes which are set forth in the Walker Report are not substantiated and are contrary to fact; but for present purposes the point we press upon the Commission is that the Walker Report ignores altogether the universally accepted fact that the telephone service in this country is the best in the world. The quality and low cost of that service are not an accident. They are due to the country-wide organization and facilities provided in the Bell System and to the fact that the business has been administered for many years under the policy of providing at all times the best possible service at the lowest rates consistent with reasonable earnings and fair treatment of employees."

● *The Bell System brief dismissed as "merely absurd" the proposal of the Walker Report that telephone rates be reduced 20 to 25 per cent.*

To counter the charge of the Walker Report and the FCC Telephone Investigation that the profits of the Bell System and the Western Electric had been excessive, the brief cited that for the past quarter-century (1913-1938, 9 months of this year) the return for the entire Bell System has averaged approximately 6¾ per cent of the net investment (gross investment less depreciation and amortization reserves). This includes the entire earnings of the companies from all sources. For Western Electric and its subsidiaries for the past 23 years the average earnings were 6.5 per cent and for the American Telephone and Telegraph Co. and its subsidiaries, other than Western Electric, the return on net investment has been 6.69 per cent.

"The investigators could have developed this figure," the brief brought out, "but apparently did not care to do so. It would have afforded no basis for an inference that profits had been high."

THE brief emphasized that the Walker Report had made an unfair attack upon Western Electric without the truth "to be found" in this portion and that this attack will not stand up under any scrutiny. Thus the brief concluded the FCC should find the base for the regulation of Western Electric as a public utility and the proposal of competitive bidding being forced upon the Bell System companies has not been supported by the evidence. The FCC Investigators made errors of tens of millions of dollars, which included an understatement of $51,966,000 for Western Electric labor and an overstatement of expenses of $6,428,000, while the complete cost figure was incorrect by $132,239,000. In the comparisons of Western Electric costs with Independent manufacturers' products, it was found that after correcting the Investigators' decimal point errors Western's costs were lower in 30 out of 37 cases of central office equipment. The brief noted only three lines were devoted to station apparatus in which Western's prices were lower than other manufacturers. This item comprised 32% of the Westerns' gross telephone sales in 1934 to the Bell System.

The Bell System in its brief took the position that the legislative recommendations of the Walker Report are not "sound proposals for presentation to the Congress" because they have been founded upon the misstatements and errors of the body of the Report. "Without important exception they are unnecessary," the brief added.

In most instances the legislative recommendations in the Walker Report were termed as detrimental to the telephone service and in several cases they are distinctly dangerous. The brief cited the proposal to have the FCC review, approve or disapprove Bell System policies "so far-reaching as to be revolutionary in the field of regulation."

THE Bell System brief replied vigorously to the charge in the Walker Report that it had tried to evade State Commission regulation by stating that these allegations "are contrary to fact. Considered in retrospect over the 30 years of its existence, State commission regulation of the telephone business on the whole," the brief stressed, "has been fair, intelligent and practical, and hence effective, and must be given a substantial part of the credit, not only for the fact that high quality of service is furnished at rates that are not in excess of reasonable rates, but also for the general public satisfaction with that service and with those rates."

"The criticisms expressed in this part

Who Is a "Customer"?

Lincoln.—Special: When a person walks into a store to use a telephone or a toilet he is still a customer and the storekeeper is still liable in event of accident, ruled the supreme court.. Justice Paine wrote an opinion affirming a judgment for $2,400 won by Mrs. Mary Haley against William C. Deer, proprietor of a tavern. She was injured March 7, 1936, when she fell through a trap door in the tavern while leaving the toilet. She had entered the tavern to telephone, according to the dispatch which appeared on Nov. 19 in the Sioux City (Ia.) Journal.

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of the Walker Report have no foundation in so far as they relate to the Bell System and, we submit, they have no foundation in so far as they relate to State regulatory commissions, or to the results of State regulation. We are confident that the Commission will not make the mistake of adopting in whole or in part the really fantastic proposal.

"The discussion in the Walker Report is a curious mixture of assumptions, some of them contrary to fact and others unrelated to fact, and of misstatements and errors repeated from earlier chapters of the Walker Report. The assertions of the benefits to come from enlarged powers of regulation desired for this Commission are fantastic. The text presents an imaginative and theoretical plea for expansion of the authority, jurisdiction, and powers of this Commission,—the kind of plea often made by those who want additional power badly and who seem to trust that fervor in pleading will prevent scrutiny of the validity of the reasons asserted in support thereof. The fact is that something over 80% of the telephone business of this country is now subject to the exclusive jurisdiction of State commissions. The Walker Report blandly recommends that this Commission should be given the authority,—without being required to assume the responsibility,—of a super board of directors of the Bell System, with power to review, and to approve or disapprove all Bell System policies. If such powers were granted and exercised one practical effect would be to destroy in large measure existing regulatory jurisdictions of State commissions."

● The National Policy of telephone communications which is outlined in the Walker Report to bring about the development of a progressively increasing volume and constantly improving quality of national wire communications service at a progressively decreasing unit cost was dealt with by the brief in a single sentence. This pointed out that the Report's declaration merely paraphrased the policy of the Bell System which had existed for many years and had been formally stated in 1927 by President Walter S. Gifford of the American Telephone and Telegraph Company before the National Association of Railroad and Utilities Commissioners at their Dallas convention.

An important section of the Bell System brief was where it countered as either made out of whole cloth or so exaggerated as to merit no serious consideration the eight claims of the FCC Telephone Investigation of Concrete Achievements in the Public Service which included the $24,000,000 reductions in toll rates, revision of broadcasting network wire, charges, hand set charges, manufacturing and accounting improvements in Western Electric, liberalization in ERPI licensing, reduction in A. T. & T. interest rate, and the A. T. & T. permission to Western Electric to manufacture and sell certain devices to connecting companies.

"In many cases the investigators claim credit for developments in the business," the brief stated, "which came from the application of company policies antedating the investigation or from the steps taken by the companies in the ordinary conduct of their business. Of course, the companies did not halt in their tracks and stop all progress when the investigation started,—on the contrary, they continued their policies and continued their efforts to improve the service in every way. Results of those policies and of the conduct of business in accordance therewith are in no sense attributable to the investigation."

THE claim of the Telephone Investigation of a $24,000,000 reduction in Long Distance rates "is not consistent with the facts," the brief stated. "To arrive at any such figures as $24,000,000, all interstate rate changes since the formation of the Commission must be credited to the Investigation.

"It is a Bell System policy of long standing, stated many times and consistently applied, to provide the "best possible telephone service at the lowest possible cost *** consistent with fair treatment of employees and such return to the stockholders as will insure the financial safety of the enterprise.'

"In the instance of only one long distance rate reduction of the American Company (Long Lines) can the Commission properly claim to have had a part, namely, the $12,000,000 reduction of January 1937. In this case, in view of improved business and earnings, and in line with the policy above stated, the Company,—prior to any discussion by representatives of the Commission,—had under active consideration a substantial reduction to take effect early in 1937. The amount of the reduction, actually made effective in January 1937, was the result of informal negotiations and agreement between the Company and the Commission but in no sense can it be fairly said that either the negotiation or the agreed reduction was a 'result of the investigation.' "

● Regarding the reduction or discontinuance of the extra charges for the hand set telephones in the states, estimated at five million dollars a year, the brief declared that "apparently credit is claimed for all reductions" since the investigator's report of Dec.

(Please turn to page 28)

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LINE and DESK

RAY BLAIN, Member A. I. E. E., Editor

Q. We have recently discovered a difference of several points in the gravity of the various cells of our sealed glass jar type storage battery. Would you consider it desirable to even the gravity by transferring electrolyte from one cell to the other?

A. If the Gravity difference is only a few points and the voltage of the cells is normal and fairly even we would not recommend this practice. In the transfer of electrolyte some is generally lost and as the volume of electrolyte in this type cell is generally fairly small this never proves desirable. We have never been in favor of much fussing around a storage battery unless it actually needs attention. When serious trouble is indicated or develops consult the manufacturer of your battery.

Q. We are using a modern type line construction truck and find it most difficult for the driver to operate the winch from the cab when raising a pole and watch the derrick at the same time. We have attempted to use a system of mirrors but without much success. Can you suggest any arrangement which can be successfully used for this purpose.

A. There is available an instrument called a "Cabscope" which accomplishes exactly what you have in mind. This instrument mounts in the roof of the cab, directly over the drivers head, and reflects an image of the roller on the end of the pole derrick. This instrument should prove a real advantage in pole raising and should eliminate several elements of danger, always present when the truck driver is working blind.

Q. In what section of the country do gophers attack underground, lead covered, buried cable? Will these same gophers also damage the new buried type wire?

A. All cases of gopher trouble which have been brought to our attention have been in the middle west. We have never heard of them causing trouble in any section of the country east of the Mississippi. If we are wrong in this we would like to hear all about it. We have a report of one case where gophers caused so much trouble on a one mile test line of the new buried wire that the line had to be abandoned. This case was located in the middle west. This wire had been plowed in and it seemed that the gophers followed the soft earth around the wire and used the space for nest building. The rubber insulation of the wire had been damaged in numerous places by the sharp teeth of the gophers. We understand that some experimenting is being done to protect this wire with a flexible metallic armor.

Q. What method can be successfully used to pull slack out of aerial cable before splicing?

A. We suggest the use of a split type woven wire grip and a chain hoist. A grade clamp may be used to anchor the cable to the messenger after it has been pulled.

Q. Should any special precautions be taken when splicing a heavy aerial cable in the center of a span?

A. If this type cable is spliced in extremely hot or cold weather ordinarily the tension should be considered to care for the unequal expansion and contraction between the cable and its supporting steel messenger. Also we prefer to use a ladder lashed to the messenger to prevent excessive sag due to the weight of the platform and the splicer. This ladder also proves most convenient for the splicer in getting upon and down from the platform.

Q. We have a truck and winch equipped with a thousand feet of line. We have been pulling this line into cable rings when pulling aerial cable. This is considerable bother and we are wondering as to whether there is a better method which can be used?

A. We place a No. 9 or 10 iron or steel wire in the cable rings as they are installed. We then use this wire to pull-in all cable of 100 pair and smaller. We use the power driven take-up reel for this purpose which has proved entirely satisfactory and can be done much easier and with greater speed than when using the winch line method.

Q. We plan to construct an aerial cable crossing of about 300 ft. Can you give us any information as to how this can best be done?

A. The method generally used for long span constructiton is to carry the cable and its supporting strand on one or more catenary strands. Vertical attachments between the supporting strand and the catenary strands should be located as required. The catenary strands are deadended at the crossing poles which must be well guyed. These deadend poles may be either single or "H" fixtures. The strain on these poles is generally terrific and in most cases some kind of special footing is required under the butts to prevent them settling. These footings can be either creosoted planks or timbers. The deadend poles should also be side guyed.

Q. We are contemplating the treating of the ceiling of our switchboard room acoustically. Do you think this should prove a good investment?

A. We are not so sure that this would prove a good investment for an ordinary switchboard room due to the following reasons; It is quite true that a properly treated ceiling will absorb rather than reflect the sound waves striking it and this will naturally tend to reduce the noise level in the room. However, we are of the opinion that the bothersome noise to an operator is generally caused by the operators on the adjacent positions and it is not believed that the ceiling treatment would correct this fault to any great extent. However, we have seen several operating rooms with treated ceilings which were considered quite satisfactory.

Q. We are planning on running some small lead covered cables for telephone service inside a large office building and we would like to know whether you would consider it satisfactory to terminate paper insulated cables direct to inside house terminals to avoid the expense of splicing on short lengths of silk and cotton insulated cables to fan out on each terminal?

A. While this method is sometimes used it is not an approved practice and we would hesitate to recommend it. If the cables are small and the runs are not overly long it might prove desirable to install silk and cotton insulated cable throughout. This would probably prove more economical than the cost of cable splicing. If this method is not desirable we suggest that you investigate the use of small sealed chamber terminals with the paper insulated lead covered cable.

CAR THIEVES CAUGHT!

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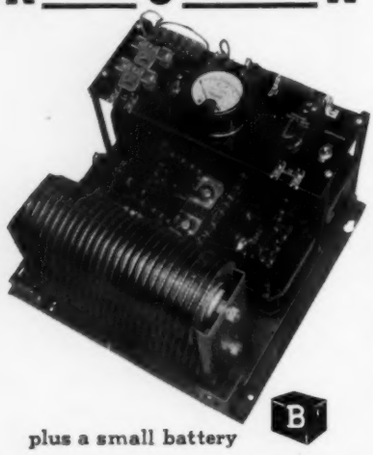

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Signed .....

Review of Bell Brief on Walker Report

(Continued from page 25)

14, 1936. That claim disregards three important facts, known to the investigators and the FCC that the hand set charge was established primarily as a control measure for the orderly introduction of that type of telephone to be reduced and eliminated as conditions permitted; that many reductions in hand set rates had been made prior to the investigation and prior to the formation of the FCC and that business conditions had improved.

"The great majority of the reductions in charges for hand sets," the brief said, "have been made voluntarily by the companies. One hundred and thirty-one of the hand set reductions were made prior to the date of the investigator's report and 81 prior to the formation of the Commission in 1934.

"The reduction or elimination of hand set charges was brought about by the application of definite company policies," the brief declared, "and not caused by the 'investigation.'"

IN THE case of the controverted subject of depreciation, the brief noted that the Walker Report makes no recommendation to Congress, but seeks to have the FCC determine now the controlling points in the problem and to commit the Federal body to prejudgment before the companies have been heard. "The impropriety of such action on the Commission's part is too plain to require argument," the brief declared, citing that the Walker Report has charged an excess of 20% in the annual depreciation charges and the companies say there is no excess.

"Obviously," the brief continued, "when the Commission comes to make an order prescribing depreciation rates, it will have to determine as one of its basic findings whether the existing depreciation rates are too high. It will have to make such a finding after hearing all pertinent evidence and it will have to base its findings on the evidence. The Walker Report would have the Commission express this finding in advance of hearing. This it cannot properly do.

● The problem must be decided by the Commission in other proceedings rather than upon the investigation, the Bell System urged. It was noted in the brief that the special committee on depreciation of the National Association of Railroad and Utilities Commissioners, including an FCC representative, and the Commission's Telephone Rate and Research Department in their reports "negative practically every important criticism of Bell System depreciation practices contained in the Walker Report. The brief cited that neither the Special Committee nor the Rate and Research Department "adopts or suggests the fantastic conclusion of the Walker Report that, if the depreciation reserves were deducted, the rate base would be reduced from 20% to 25%, with a potential reduction in revenue requirements, and consequently in telephone rates, of from 7% to 9%. That this conclusion is false is easily demonstrable. It is based on the hypothesis that cost of property less depreciation reserve is the proper rate base. The conclusion is that the Bell System, as a result of its failure in rate cases to deduct the entire reserve in arriving at a rate base, has received a rate of return so excessive as to permit a 7% to 9% reduction in revenues.

"After making full adjustment for the failure of the Bell System to deduct the entire depreciation reserve in rate cases, we find that telephone rates in the first nine months of 1938 show a return of only 6.16%. The reduction of 7% to 9% in telephone rates suggested by the Walker Report in this connection would reduce this quite moderate return to approximately 4.28% if there were a 7% reduction, or 3.74% if there were a 9% reduction. These percentages would be somewhat reduced if allowance were made in the rate base for working capital, as the Walker Report concedes should be done. It is clear that such rates of return would be confiscatory."

Death Takes Frank L. Beam

Frank L. Beam, 79, a charter member of the Independent Pioneers Telephone Association, for 20 years president of the Ohio Independent Telephone Association, and president of the Mt. Vernon (Ohio) Telephone Company from its inception till 1929, died at his home in Mt. Vernon, Ohio, on November 12, just 2 days before his 80th birthday.

Starting in the telephone business in 1894 his activity continued until 1929 when there was a change in ownership of the Mt. Vernon Telephone Company. At various times throughout his career he was connected with many Independent telephone properties besides many other commercial enterprises. His civic activities were many and his philanthropies generous.

The Independent telephone industry loses one of its pioneer figures in mourning the loss of Mr. Beam. Surviving are his widow, two sons and 3 daughters.

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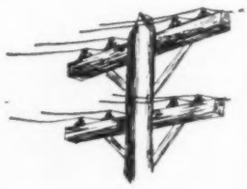

Transmission Measurements

THE INTEREST which has been shown in transmission measurements on telephone circuits prompts me to again discuss the equipment used and the method of making tests. The theory of the transmission unit (decibel) was discussed in the series of articles on telephone transmission (Telephone Engineer, June and July, 1936) and a review of these issues will be of value.

The circuit diagram of a complete transmission measuring set is shown in Fig 1. The source of tone is a dynatron type oscillator connected to appropriate amplifier tubes. The frequency of the oscillator is adjusted by changing the size of the tuning condenser in the oscillating circuit. The output impedance of the amplifier is 600 ohms. This value is obtained by an appropriate output transformer. The switching arrangement permits connecting the oscillator to the meter when the switch is in the "CAL" (calibrate) position. When the switch is in the "SEND" position the oscillator is connected to the "SEND-REC" (send-receive) terminals. With the switch in the "REC" (receive) position the meter is connected to the "SEND-REC" terminals. When the switch is in the "Loop" position the oscillator is connected to the "SEND-REC" terminals and the meter to the "LOOP" terminals.

THE meter is of the standard level indicator type which may be purchased from any manufacturer of instruments. The type shown in the drawing and the one which we prefer is calibrated from +1 to —14 db. The sensitivity is such that when the meter indicates zero the voltage across its terminals is 0.548 volts. Under such conditions the range of the instrument will extend from —24 db to a +21 db. The series and shunt resistors are so chosen at the impedance looking into the terminals of the network is 600 ohms. The reference level under such conditions is 5 milliwatts. In other words with the meter switch on 0 and the meter reading 0 db, 5 milliwatts is delivered to the meter network. For convenience in describing the operation the dials will be termed as follows. The potentiometer controlling the signal from the oscillator is the "OUTPUT." The switch connecting the oscillator to the meter and to the terminals is the "TEST" switch. The switch associated with the meter to control the range is the "METER' switch.

● The method used in making transmission loss measurements on lines and equipment and gain measurements on

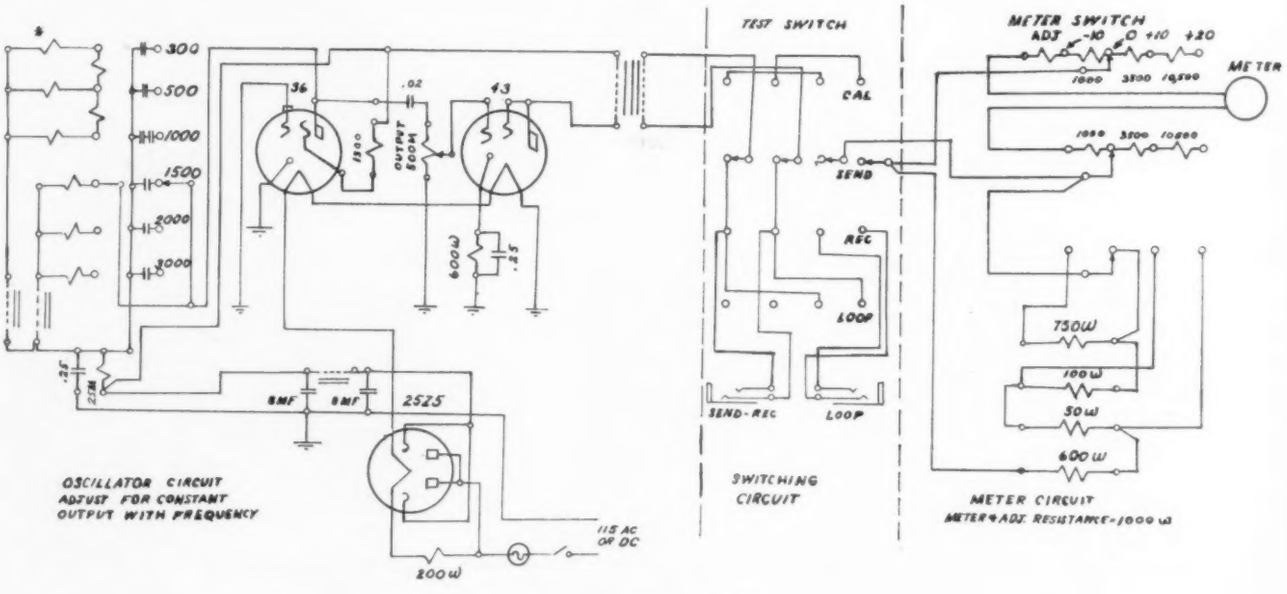

Fig. 1—Diagram of Transmission Set

Younger brothers of your telephone

This one helps entertain and instruct millions

Did you know that talking pictures are a product of Bell Telephone Laboratories research? And that the majority of pictures today are both recorded in the principal studios and reproduced in thousands of theatres by means of Western Electric sound equipment?

(Above is a section of film, with the sound track at left of picture).

This one helps the hard-of-hearing to hear

If your hearing is impaired, you'll be interested in Western Electric's new Ortho-Technic Audiphone. Another outgrowth of Bell System research, this instrument is built on entirely new principles in hearing aid design. It does things no previous aid could do. It will bring easier hearing and greater happiness to thousands.

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When you travel on any of the nation's major airlines, the air-minded brother of your Bell Telephone flies with you. Western Electric radio telephones keep pilots and airports in touch—help to

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When police use Western Electric radio, arrests increase and crimes decrease. Your Bell Telephone makers pioneered in the police radio field. Today Western Electric equipment is giving added protection to 45 million people. Has your community this law enforcement aid?

All these benefits and more came out of the telephone

Since 1882 Western Electric has been the manufacturer for the Bell System, and this is still its major activity.

Experience in the field of sound-transmission has frequently enabled the Company to apply its skill in the making of other sound equipment that plays an important part in daily living.

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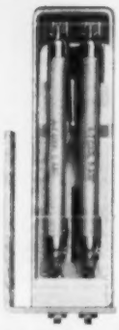

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repeaters is as follows. We will first consider what is known as straight away measurements, that is where two transmission sets are used one at each end of a long line. Each end of the circuit to be measured is connected to the transmission set "SEND-REC" terminals or jacks. For measurement in the E-W direction the operator at the east terminal first throws the "TEST" switch to the "CAL" position thus connecting the oscillator to the meter. The output of the oscillator is then adjusted by means of the "OUTPUT" control to a given level, for example, 0 on the meter with the METER on 0. When the output of the oscillator has been set at the desired level the "TEST" switch is turned to the "SEND" position which connects the oscillator to the "Send-Receive" terminals.

The operator at the west end throws the "TEST" switch to the "RECEIVE" position and reads the level. For example, if the meter reading is —5 with the meter switch on zero the transmission loss through the circuit is 5 db. If the reading is —5 with the decibel switch on —10 the transmission loss is 15 db. Where the transmission equivalent is so great that no deflection is observed on the meter, the output at the sending end may be raised until a reading is obtained at the receiving end. For example, if the sending level necessary to give a deflection of the meter at the receiving end was +15 and the receiving level was —20 the circuit loss would be 35 db.

ON measurements in the W-E direction the procedure is similar. The west station first throws the TEST switch in his transmission set to "CAL" and adjusts the output to a given level, then throws it to the "SEND" position. At the east end the operator places the TEST switch on the "REC" position and reads the meter.

When testing equipment and lines which can be looped together so that all measurements can be made at one point, the "LOOP" circuit of the transmission set may be used. For example, if it is desired to measure the loss through a repeating coil, one side would be connected to the "SEND-REC" jack and the other to the "LOOP" jack. The test switch is first thrown to "CAL" and the output adjusted to a given level. The switch is then thrown to the "LOOP" position and the meter reading noted. The loss is the difference between the two readings. For example, if the meter read zero on the "CAL" position and —1.5 on the "LOOP" position the loss would be 1.5 db.

The method of measuring the gain of repeaters is as follows. Assume it is desired to measure the gain through the E-W side of the repeater; connect the east side of the repeater to the "SEND-REC" terminals and the west side of the repeater to the "LOOP" terminals. Throw the "TEST" switch to the "LOOP" position and adjust the output of the oscillator until the meter reads a given level say 0. Then throw the switch to the "CAL" position and read the meter. The difference represents the gain through the repeater. For example, if the meter reading on the "LOOP" position is zero and on the "CAL" position —10 the gain through the repeater is 10 db. In making measurements through vacuum tube equipment care must be used so as to not overload the tubes. For example, most telephone repeaters will pass a level of about +5 db without overloading. Appreciable errors might result therefore, if the oscillator output is adjusted so high that the level at the output of the repeater exceeds this amount. Ordinarily, on repeatered circuits the output level from the transmission set may be carried as high as zero without the possibility of trouble. However, where terminal repeaters are used care must be exercised to see that the level is sufficiently low that overloading will not occur.

● In measuring the loss or gain through equipment slight errors may be occasionally observed due to the reactive component in the output impedance of the oscillator. This may be eliminated by inserting a balanced five or ten db pad between the oscillator and the equipment being tested. This error does not exceed a fraction of a db and in practical measurements may be neglected.

END

THANKS!

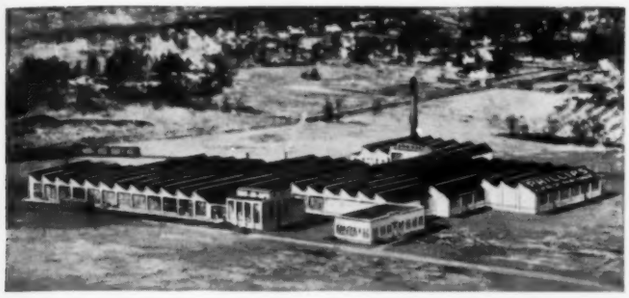
Telephone Engineer,
185 North Wabash Ave.,
Chicago, Ill.

Gentlemen:

In renewing the subscription of the "Telephone Engineer" may I compliment Messrs. Blaine, Binden and Clark for technical and practical subjects presented in a plain, straightforward, amazingly simple and clean, understandable text. The members of the art are thankful.

Yours truly,
LEO. S. BLACKMAN

c/o U. S. Cable Ship
"Joseph Henry",
Army Base,
Brooklyn, N. Y.
November 10, 1938.



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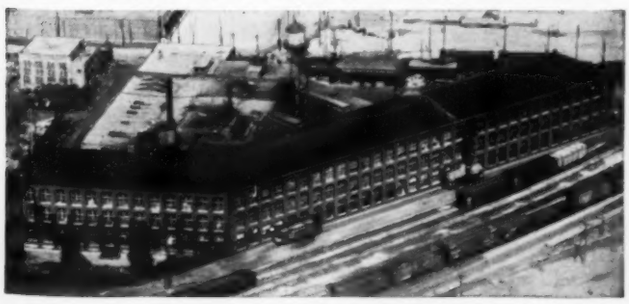

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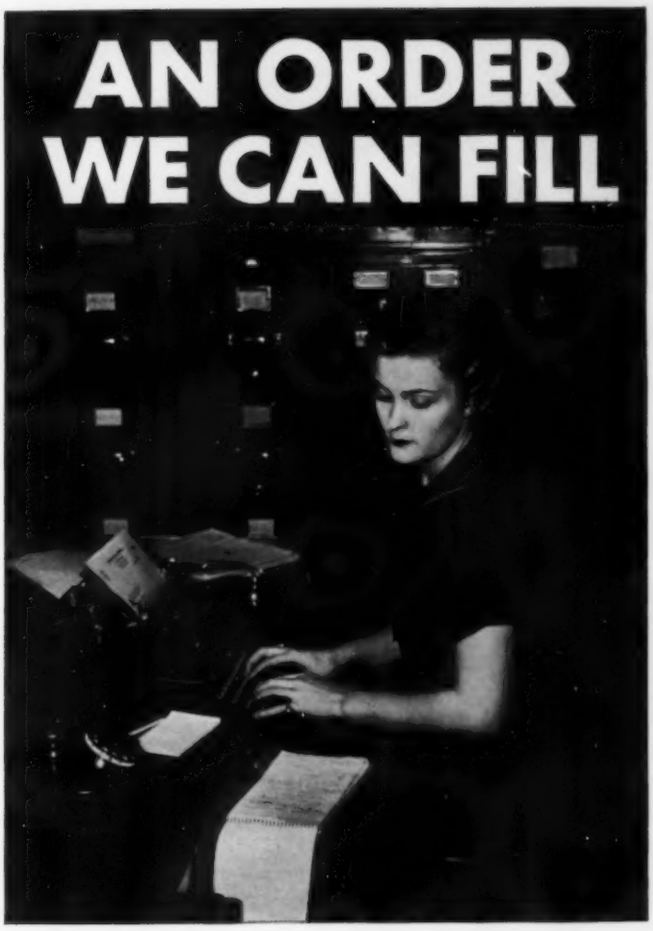

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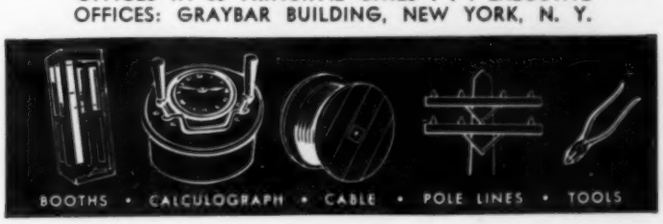


The corner that didn't hold. Poles were not raked properly and guys were not adequate. This type of construction should be avoided.

Recent Changes in Construction

(Continued from page 18)

erly when a toll line followed a road around a curve it was considered good practice to make a corner and guy every other pole. Now on many lines each pole on the curve is considered a corner and guyed. This divides the strain and makes, we believe, a better overal job. Ease of installation and low cost of anchors has no doubt done much to promote the idea of more generous guying.

It is noted also that in some cases the lead on guys has been reduced to only about 2½ ft. where space is limited. Strange to say these guys hold an ordinary strain extremely well. Also the "H" fixture with one guy in the center is rapidly becoming a popular type of corner construction is some sections of the country. The eye bolt method of attaching guys to poles, even on rural lines is now in general use and we believe well worth all it costs.

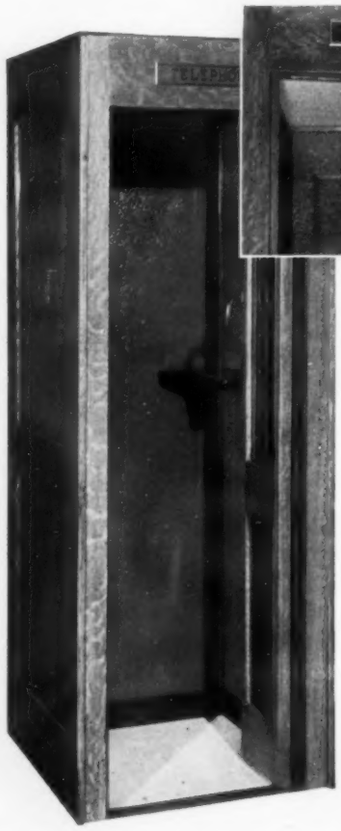
Many new items of pole hardware have recently come into general use. We contend that the old wood bracket, attached to poles with nails is obsolete and will no doubt soon be replaced by a more substantial fixture. We believe this is evidenced by the recent appearance of numerous devices designed with a view of replacing the wood bracket. Some companies use a fixture in the form of a clevice to hold an insulator which is attached to the pole with bolts, for deadending of the wires. Many also use small strain insulators wired to poles for deadending and turning corners. These arrangements, in our opinion, do a much better job than the wood brackets.

● We note also from time to time the efforts of individuals to devise something better than the wood bracket. One resourceful telephone man drilled a hole in his poles and then drove into it the ordinary wood pin. He claimed that the result proved far better support for the line wire than the old wood bracket. Another exchange owner designed an angle iron crossarm on which he attached iron pins to support the insulators. This arrangement presented a neat appearance which is undoubtedly strong and lasting but we hesitate to think of the cost involved. However, again this may be action in the right direction and in time develop into something worthwhile.

Another tendency we have noted with favor is a revival of interest in proper and adequate protection of lines from lightning discharges and accidental contact with high voltage power lines. We noted one exchange where no doubt all cable terminals on the original installation had been of the unprotected type. Later apparently separate protection had been installed at all terminals though some of them did not have a single drop wire connected. We assumed that considerable trouble had been experienced due to the lack of protection, and all terminals were properly equipped so that, if and when, lines were placed in service they would be properly protected.

WE NOTED also protectors installed about two poles from the cable terminal on several open wire lines. In a few cases protectors were installed both

(Please turn to page 37)



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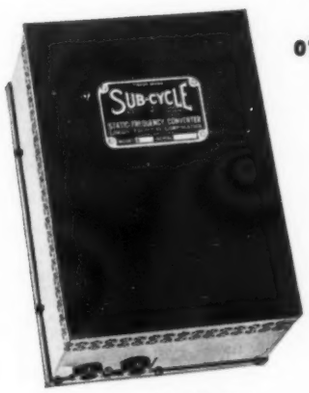

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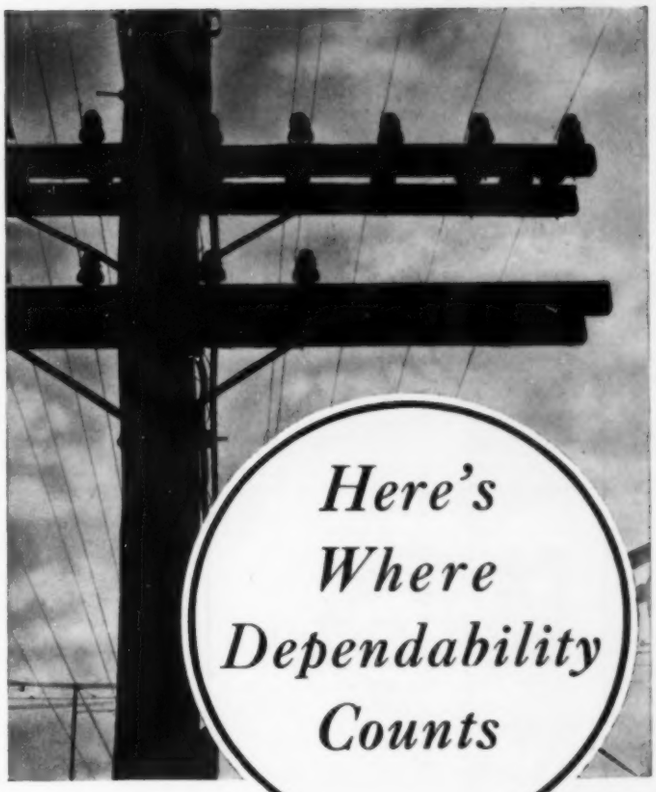

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THE dependability and long life of Perfected Telephone, Telegraph Wires and Strand are no small factors in the excellent operation of the nation's communication systems.

The long life of these wires is further increased by our hot galvanizing process, a tried and tested method wherein the properly treated wire is passed through a molten bath of pure, high grade zinc. Both metals are chemically bonded, to form as strong a combination as when hydrogen is combined with oxygen to form water.

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MAKE THOSE STORMY DAYS COUNT FOR PROFITS

When the weather is "mean" outside—that's the day to dig out your stock of out-of-service telephone parts and check them over for profit-making uses. Telephone equipment is not a loss just because it is defective or out of order. Many dollars can be made by using Suttle Remanufacturing Service to incorporate these old parts in new equipment.

Study over the Suttle Catalog before you start, to refresh your mind on what can be done with your parts. Then check and sort them to fit in with your equipment needs. Then make shipment of the parts to Suttle and cash in on you work.

The nice part of it is that when you send them to Suttle you don't have to worry or guess about results. You'll get back a job manufactured to top notch standards of brand new equipment.

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Drop forged tool steel. Rapid cutter Blade may be placed next to main limb of tree with hook handle held in LEFT hand. Right hand is FREE to operate blade. 26" handles.

No. 1-W Tree Trimmer
Most powerful compound lever Tree Trimmer made. Will easily sever branches up to 1¾" diam. Pulley and compound lever give 9 to 1 cutting power. Head complete weighs only 1¾ lbs. 4 to 16 ft. lengths. Other types.

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Stromberg-Carlson Issues New Price List

A new price list covering all Stromberg-Carlson central energy telephones and piece parts has just been issued by the Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y. It covers all items as shown in the firm's Bulletin, No. 38-A.

"Phone Week" Proclaimed by Mayor

A unique promotion idea was fostered during November at Jacksonville, Fla., that many telephone companies could emulate to much advantage. It is a builder of goodwill in public relations and new station installations in your business office.

Mayor George C. Blume, mayor of Jacksonville, proclaimed November 14-18 as "Telephone Week" by proclamation to start off the "Open House" celebration that is being conducted by the telephone company. The proclamation was published in the press and received widespread publicity that is very valuable as a public relations program. It contained all information relative the open house program and was much more effective than any other plan of advertising the open house to the public. By using this plan the open house was a huge success in every way.

Former A.T. & T. Organizer Dies

Brigadier General Edward P. Meaney, 84, one of the organizers of the American Bell Telephone Company, died here Nov. 24.

Mr. Meaney, who had lived here for three years, was counsel for the American Telephone and Telegraph Company for many years. He formerly lived in New York.

He became vice president of the Mexican Central and Southern Railroad in 1889, and in 1893 he was named Judge Advocate of New Jersey, where he was a prominent Democrat.

Phone Rate Attorney Selected by SEC

George Slaff, New York attorney who was employed in 1936 by the City of Louisville as special counsel in the telephone rate investigation, has been appointed principal attorney of the Public Utilities Division of the Securities and Exchange Commission in Washington.

Sale of Nebraska Exchanges Authorized

The Nebraska railway commission has approved the purchase by E. H. Hunt of exchanges at Bloomfield, Crofton, Wausa, Winnetoon, Verdigre and Osmond from the Western Telephone corporation and their sale (except Osmond) by him to the Union Telephone company at Blair which he largely owns. The latter was authorized to issue $55,000 of bonds and $40,000 of stock to finance the purchase.

Hunt intends to link the newly acquired property with the Northeastern Telephone company at Walthill, another of his properties, but a legal technicality was in the way and the shift was made to the Union which has operated an exchange at Carroll.

Sales Contests

(Continued from page 20)

● And now for college. Here we begin to hand out the pennants and do a little hazing. Each 10% of quota puts you through one year of campus life. You will note that cumulative totals of quota run up to 110%. For this reason it is important that quotas be set low so that all men have a fairly good chance to graduate from college. All men who go to college get "money from home" in the form of an allowance, and all the men who graduate get handsome graduation gifts which should be presented at mock graduation exercises complete with cap and gown, diplomas and the honorary sales fraternity of Phi Beta Sella.

PROGRESS in this contest is indicated by means of a huge report card with four columns to indicate: A—for awfully bright; B—for bright; C—for capable; and D—for dumb. At any one time your group is divided into four equal parts, with one-quarter of the men listed in each category. Alongside of each name, of course, should be indicated his current quota standing.

There is lots of fun in this contest, and the men who "work their way through college" will be really building sales records as they go. Try it.

FREE! Just send us a self-addressed stamped envelope and we'll send you a copy of the SALES CONTEST CHECK LIST—It should guarantee the success of your next contest.

Recent Changes in Construction Methods

(Continued from page 34)

at this point and also at the cable terminal. This was no doubt done with a view of making doubly sure that adequate protection was provided for the cable. We have always contended that good protection is much cheaper than cable and from present indications, in this view we now have quite a following.

From time to time in various sections of the country we have noted the efforts of some individuals to build a makeshift sort of protection locally for use on their lines. In one case a metal tube about 12 inches long encircled the line wire and was insulated from it by No. 4 porcelain knobs strung on the wire itself. The metal tube was grounded and the discharge was supposed to be from the wire to the metal tube. This arrangement was used both at the cable terminal and at the first pole on the line. Choke coils were also installed at some of the metal tubes. Commercial protection of all approved types is now on the market at a reasonable cost and we contend that all efforts at local fabrication of any type would not ordinarily prove economical.

A general trend toward the use of short lengths of cable to carry open wire lines, under rather than over, highways, railroad crossings and dangerous power lines, is also noted. One or two pair cables are generally used on lines of 1 or 2 circuits and cables of ten pair or larger used on heavy leads. Tape armored cable is generally used for this purpose. The 2-pair buried type wire is also being used quite extensively for these underground dips. The new type buried wire with a metallic covering, should increase the popularity of this type construction in some localities.

● Cable terminals of the protected type are generally installed on the larger cables and the small cables are often connected, through protectors direct to the open wire. Protectors can be obtained at a small cost to use for this purpose. These underground dips, we understand, have in general proved most successful from both a service and economical standpoint.

Another practice now becoming quite general is that of using parallel or twisted pair drop wire to extend lines from the main open wire lead to the first pole on a branch line. This eliminates the necessity of a bothersome buck-arm and provides much better clearance. Drop wire is also often used in this manner to extend open wire lines over certain road crossings to provide better clearance. An extension fixture, constructed of angle iron, is used often to provide greater pole height for the drop wire crossing. No doubt there is possibilities for the use of the newly developed, 2-pair parallel type drop wire for this purpose.

Drop wire is now commonly used to extend lines a span from the main lead to the branch line.

CONSIDERABLE improvement is likewise noted in cable construction methods in general. Companies who a few years ago never even thought of grade clamps now use them religiously. A general effort is being made to construct cable plant in a manner so as to provide maximum life with a corresponding low maintenance cost. This applies to aerial as well as underground plant. We noted one aerial cable line where the center of the spans were all anchored either to the ground or back to the poles in order to reduce vibration of the span to a *minimum*. This was no doubt an experiment and in our opinion not ordinarily required when the messenger is pulled to the proper tension. Various improved types of cable rings are now be-

A NEW

4 FREQUENCY MOTOR GENERATOR

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Requires neither brushes or collector rings.

Low cost maintenance.

Low current consumption.

Output 25 watts.

Can be furnished for A.C. or D.C. drive or both.

Can be equipped with tone, and machine ringing interrupters.

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A DEPENDABLE
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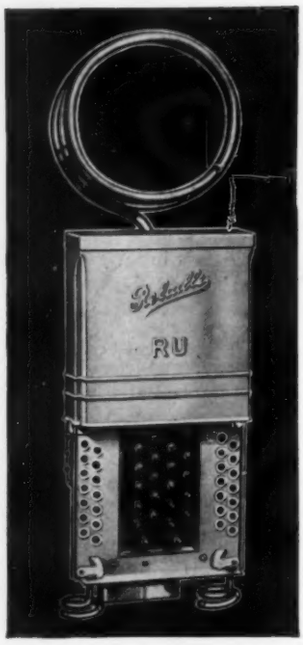

Reliable

Type RU unprotected terminals are easy to install, easy to work on and built to outlast the cable.

Upon request we will send a sample for your inspection without charge.

Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
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ing used to prevent sheath cuts. The proper use of the new dynamometer we believe will do much to avoid trouble on aerial cable plant.

Underground cable plant is being made better by the use of larger and better manholes and good conduit runs. Improved construction methods and cheaper material now places underground construction within the reach of many companies who a few short years ago considered it entirely out of their picture. Single duct clay conduit of a new type has recently been developed. New methods of manufacture now make it possible to construct this type conduit in 36 inch lengths. Also a new application is being tried on the 20 inch sections of the single clay conduit. Three short lengths are joined in the yard to make a 5 ft. section and transported as a unit to the iob for installation. Long dowel pins ,of a small size, extend entirely through the three pieces, and the joints covered with wide rubber bands cut from old inner tubes. This is certainly something new and no doubt will prove advantageous in some exchanges.

WE NOTE with considerable pleasure that telephone people of the Independent field are now making greater use of good tools than at any previous period of our history. The days of the troubleman with a broken bladed knife are decidedly out of the picture. The saying that "Good tools make good workmen and good workmen make good bank accounts" is evidently proving true. Line trucks of an approved type are now a common sight. General use is being made of electric hammer drills and electrical operated tools in general. The gasoline operated hammer fills a need of long standing as it replaces the large air compressor and jack hammer and is available for use in the small exchanges. Telephone people have finally learned, or so it seems, that good tools always prove a good investment. The telephone business has always been a lot of fun and who knows but that it may also, sometime, somewhere, somehow, pay big dividends.

END

"The Story of Western Electric"

Copies of the new Western Electric 32 page booklet entitled "The Story of Western Electric—Service of Supply for the Bell System" have just been received by the editor. Over 15 full pages of illustrations enhance the very interesting information compiled for the edification of the public.

Citing statistics regarding usage of the telephone, the book discusses the company's responsibilities, information regarding adequate supply and standardization and other pertinent subjects. It contains a wealth of knowledge regarding Western Electric and their service to telephony through the years.

Copies will be sent to those requesting, either to the company or to the editor.

Thomas Meinema Dies

Thomas George Meinema, telephone engineer of The Holtzer-Cabot Electric Company, died Thursday October 27th, 1938, at Fairhope, Alabama.

Mr. Meinema, a native and resident of Chicago had recently gone to Fairhope, Alabama to spend the winter. He was well known in the telephone industry, having been associated with it for the past 41 years, 38 years of which he spent in the employ of The Holtzer-Cabot Electric Co., manufacturers of telephone ringing and interrupter equipment.

Surviving Mr. Meinema are his wife, Anna, daughter Iris, and three sons, George, Herbert and Harold. Interment was in Fairhope cemetery, Fairhope, Alabama.

Obituaries

MERTON JEWELL CORWIN, Born June 10th, 1877, at Lockport, Illinois, E E. PURDUE '98. Died Nov. 2nd apoplexy.

IRA V. CORBIN, 75, president of the Sandborn (Ind.) Telephone Company, died suddenly at his residence Nov. 10. Survivors are his widow, 2 sons and a daughter.

Texas REA Case to Be Heard in February

According to George B. Butler, secretary of the Texas Telephone Association, the suit brought by the Hall Telephone Company against an REA Cooperative will be heard before the Court of Civil Appeals, in Austin, Texas, on February 8. Oral arguments will be presented by attorneys of the Cooperative and the Hall Company which was successful in the lower court which ruled against the REA. At the hearing briefs will be presented by each side. Ruling is expected in late March or early April.

President Oscar Burton of the Texas Telephone Association has announced the decision of ballot on the Covention city for 1939 for their annual convention with Dallas, the winner. Baker Hotel will be headquarters with sessions scheduled at the hotel on March 22, 23 and 24th.

Washington Column

(Continued from page 14)

2. *The reorganization of the FCC.* Reports that the New Deal legislative drafting team of Corcoran and Cohen were preparing a new Communications Act with a new Commission setup have been completely denied by FCC Chairman McNinch. However, President Roosevelt has indicated that he will again seek to have his governmental reorganization bill enacted at the next Congress and when that measure is transmitted it may disclose a new shifting of the FCC, it is speculated. In fact, there has been considerable discussion about the advisability of severing communications regulations from broadcasting into two agencies and such a plan is being given some study.

3. *A wide expansion of FCC regulation over the construction and extension of telephone toll facilities,* even though the latter carried a very small percentage of interstate traffic by means of switched connections, is presaged in a decision of the Commission which ruled that Bell System and other companies subject to its full jurisdiction would have to seek certificates of convenience and necessity for any toll construction or permission to supplement toll facilities both in the case of interstate circuits and intrastate circuits, where the latter handled some small amount of interstate business. The decision came in the case of the Southwestern Bell Telephone Co., which added six wires to its existing intrastate toll lines in Texas. The ruling of the FCC rejected not only the position of the Bell System but also that of the National Association of Railroad and Utilities Commissioners, representing the state commissions. It is believed likely that the courts may be asked for an interpretation of the FCC powers in this matter of toll facilities with a small amount of intrastate traffic. The FCC stressed that it desired to separate the interstate property from the intrastate plan in all toll facilities.

4. *The FCC in a significant jurisdictional opinion which mainly affects telegraph companies* held that all carriers that extend their lines into new territory through construction, acquisition, leasing or other arrangements should comply with Section 214 of the Communications Act in securing a certificate of convenience and necessity. This means that telegraph companies have to secure approval for the leasing of circuits from telephone companies. The FCC opinion indicated that it was desirous of scrutinizing the competitive effects of any extensions of service by the various carriers into new territories.

6. *The recent U. S. Supreme Court decision which held the Consolidated Edison Co., was subject to the Federal jurisdiction of the National Labor Relations Act,* despite the fact of the power company only having 3% of its business interstate, is important to the telephone industry because it shows that the court regards the service of utilities in interstate commerce as most valuable and not to be disrupted. Whether or not this same ruling would apply to a small intrastate Independent telephone company could not be predicted because the court might take a different position with another set of facts. However, as far as the potential expansion of Federal communications regulation because of the implications of this decision, that would be rather doubtful assumption. The Supreme Court probably took the view that the interruption of service due to labor troubles was a matter of substantial importance to interstate commerce, but possibly would not consider a similar position in deliberating upon the value of regulating local rates and practices by a state commission in comparison with a Federal commission.

Legal Interpretation of Section 13 (a) (2)

ALTHOUGH citing that it recognized the telephone companies perform "services", the Wages-Hours Administration in an Interpretative Bulletin by its General Counsel Calvert Magruder, held the opinion that the telephone industry nevertheless was not, "in the ordinary case," sufficiently similar in character to retail establishments to be considered "service establishments" so as to fall within the exemptions from the law under Section 13 (a) (2). The opinion cited that it "is not free from doubt in respect of some of such classes of businesses (a score of businesses and industries, including the U. S. Independent Telephone Association and broadcasting stations, had claimed they were services) and does not purport to embrace all possible subclassifications."

In the fourth paragraph of the Interpretative Bulletin, which dealt with "the scope and applicability of the exemption provided by Section 13(a)(2) of the Fair Labor Standards Act", the language of the interpretation of the applicability of the minimum wages and maximum hours provisions of Sections 6 and 7 might form an interesting basis of legal reasoning to indicate that for the telephone industry interstate toll operators might be the employees who could be definitely determined as covered by the Fair Labor Standards Act.

The Interpretative Bulletin noted that

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under Sections 6 and 7 the test prescribed "is related to the nature of employment of the particular *employee*.*** Thus, under Section 6 and 7 *some* employees of a given industry or of a given employer may be covered and others may not be covered."

● Stressing that "service establishments" as used in Sections 13 (a) (2) may be considered to include generally that large miscellaneous assortment of business enterprises which are similar to retail establishments in character but which may not be accurately classified as such, including restaurants, hotels, laundries, garages, barber shops, funeral homes, the Bulletin state that "service establishments are usually local in character and render a service to the ultimate consumer for direct consumption" and "the service is usually purchased in small quantities for private use rather than for industrial or business purposes."

The Bulletin declared that Congress had made a studied effort to exempt precisely certain classes of employees and in Section 13 (a) (9) which exempts street and interurban electric railway and motor busses these "certain special classes of utilities" were designated by Congress. "If Congress had intended utilities in general to be considered as, 'service establishments,' there would, of course, have been no need for any such specific exemption," the Bulletin stressed.

IN discussing the quandary and position of the various businesses and industries, including the Independent telephone companies, that they were "service establishments," the Bulletin stated the following:

"Numerous letters have been received from banks (both commercial and savings), building and loan associations, personal loan companies, insurance companies, telephone companies, radio broadcasting stations, toll bridge companies, water supply companies, electric and gas utilities, stock brokers, security dealers, factors, printing and binding concerns, advertising agencies, commercial art firms, investment counsel, compilers of mailing lists, credit rating agencies, legal firms, accounting firms, engineering firms, firms engaged in making geological surveys, concerns engaged in compiling and distributing information to lawyers regarding new legal developments, companies engaged in renting construction equipment, companies engaged in supplying watchmen, guards and detectives for industry, building contractors, warehouse companies, machine shops and foundries, drydock companies, companies engaged in contract oil-well drilling and dental laboratory and supply houses. Each asserts that it is engaged in rendering 'service.' Although we recognize that the foregoing companies perform 'services,' it is nevertheless our opinion that such enterprises are not, in the ordinary case, sufficiently similar in character to retail establishments to be considered "service establishments" with the meaning of Section 13 (a) (2). This opinion is not free from doubt in respect of some of such classes of businesses and does not purport to embrace all possible subclassifications.

● "In a broad sense every business performs 'service' yet no one would seriously urge that all types of businesses were eligible for exemption under Section 13 (a) (2). It would be surprising indeed, if Congress had intended by the one word 'service,' as used in the phrase 'retail or service establishments,' to grant an exemption broad enough to include all of the above-mentioned classes of businesses, and there is nothing in the legislative history of Section 13 (a (2) to support such a conclusion."

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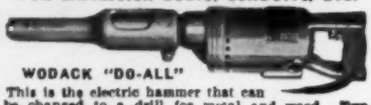

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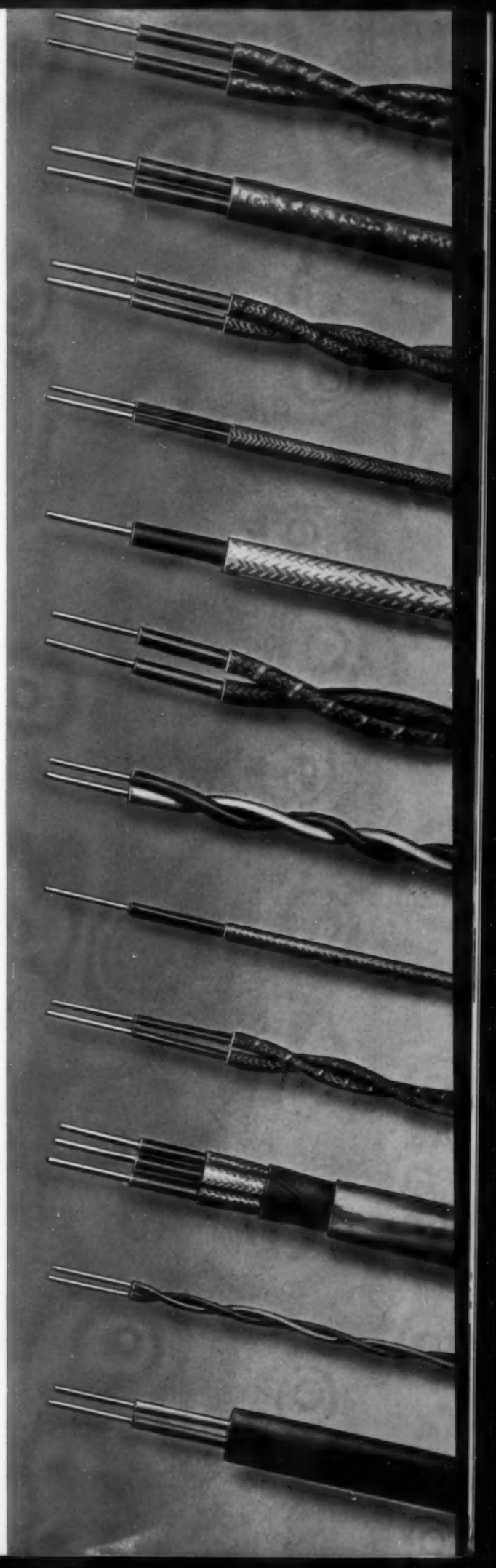

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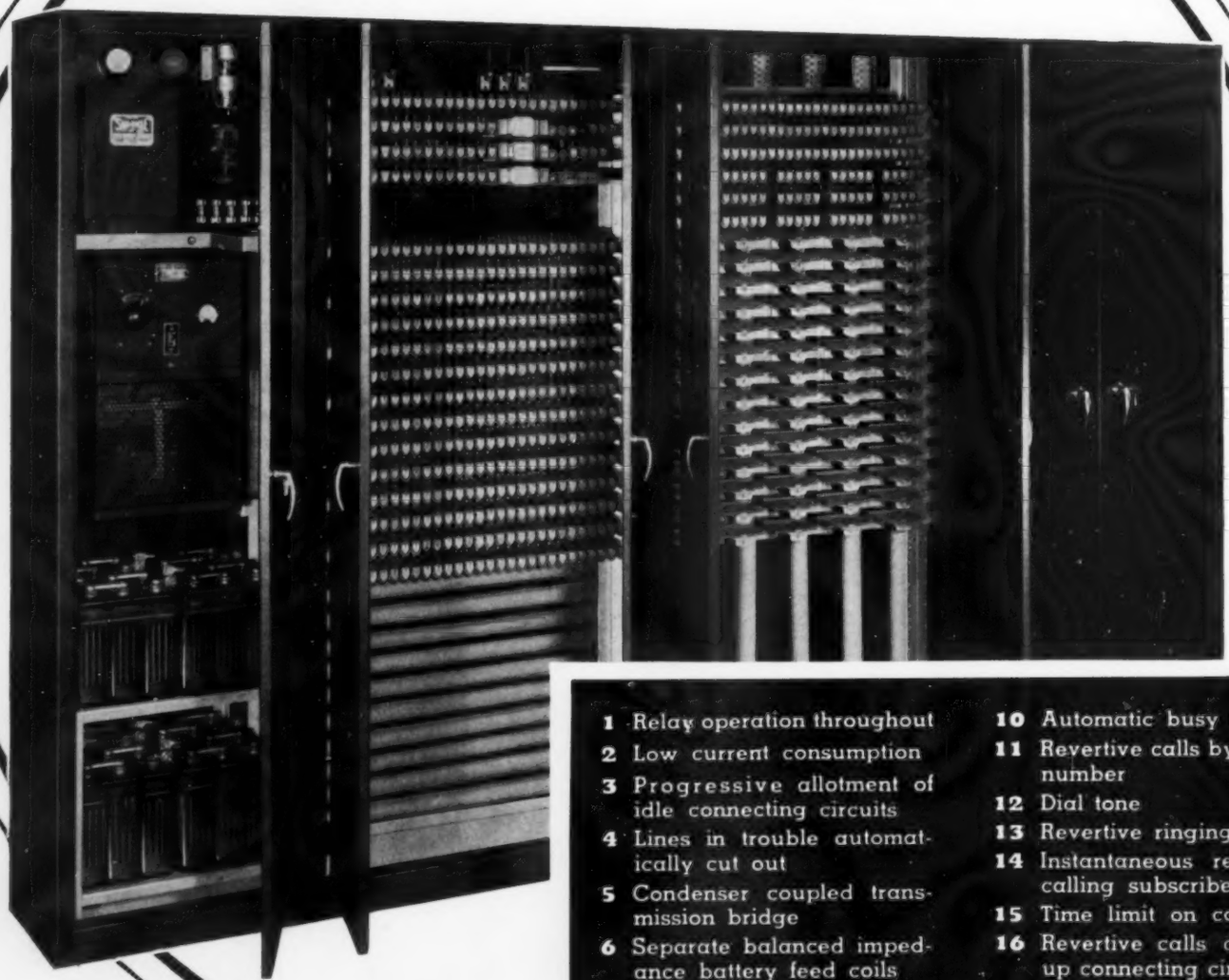

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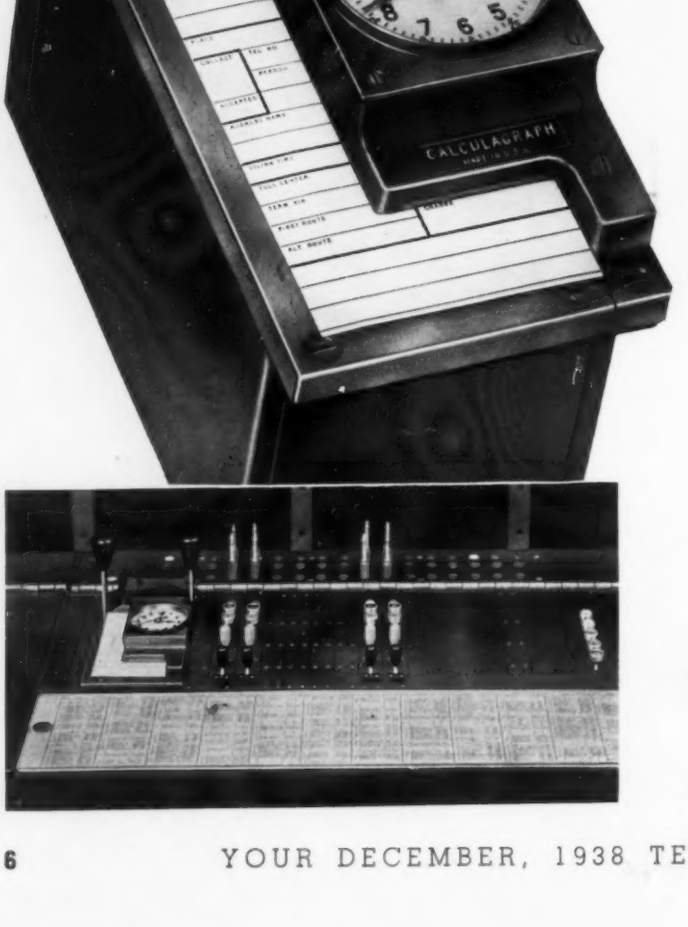
SWITCHBOARD & SUPPLY CO.

The NEW CALCULAGRAPH MODEL 33



IT'S ELECTRIC

Prints elapsed time to a second on a standard toll ticket.

IT'S SMALL

7½ x 3⅜ inches. Fits most local boards; times short-haul calls, too.

HAS SWEEP SECOND HAND

Tells the end of the initial period at a glance.

●

Let's tell you more about it. Write to

THE CALCULAGRAPH COMPANY

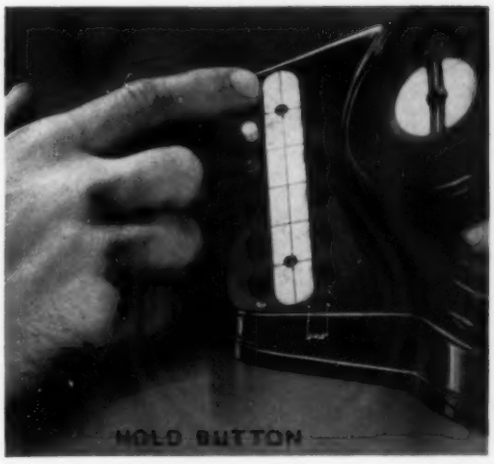
Department 22

50 Church Street **New York City**

INTERCOMMUNICATING OR CENTRAL OFFICE SERVICE WITHOUT A PBX OPERATOR

The Stromberg-Carlson 2-10 System

Any station equipped with central office buttons can answer an incoming call. The subscriber merely removes the receiver, operates the proper central office button and answers as ordinarily.



When the subscriber answers a call and finds it for some other station, he merely presses the central office common holding button which places a holding circuit across the central office line.

The subscriber then presses the ringing button of the station desired and advises the party called to operate the proper central office button as there is a call for that station on the central office line.

The party called then knows that someone wishes to converse with him and on which line.

He then pushes the proper button and proceeds to converse as ordinarily.

IN most communities there are many places where this new Stromberg-Carlson System can be installed. It is a common talking, selective ringing telephone system with 10 lines and 2 trunks, providing local intercommunication and central office service from the same telephone without the services of an attendant operator.

On the base of each telephone are 12 non-locking push buttons for ringing selectively any local telephone and for answering, holding, transferring or originating central office calls. All stations can be used for the preceding purposes. All stations can be arranged for secret service on both central office trunks. The equipment operates from a central office battery of 22 volts or 18 local dry batteries of 1½ volts each.

Sub-station instrum
used with Stromb
Carlson 2-10 Syst

Write for illustrated descriptive Bulletin.

Stromberg-Carlson Telephone Mfg. Co., Factory and General Offices: 100 Carlson Road, Rochester, N. Y., U. S. A., Branch Offices: Chicago, Kansas City, San Francisco, Toronto

Stromberg-Carlson

MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR MORE THAN FORTY YEARS

Interpreting the VALUE *of Telephone Service*

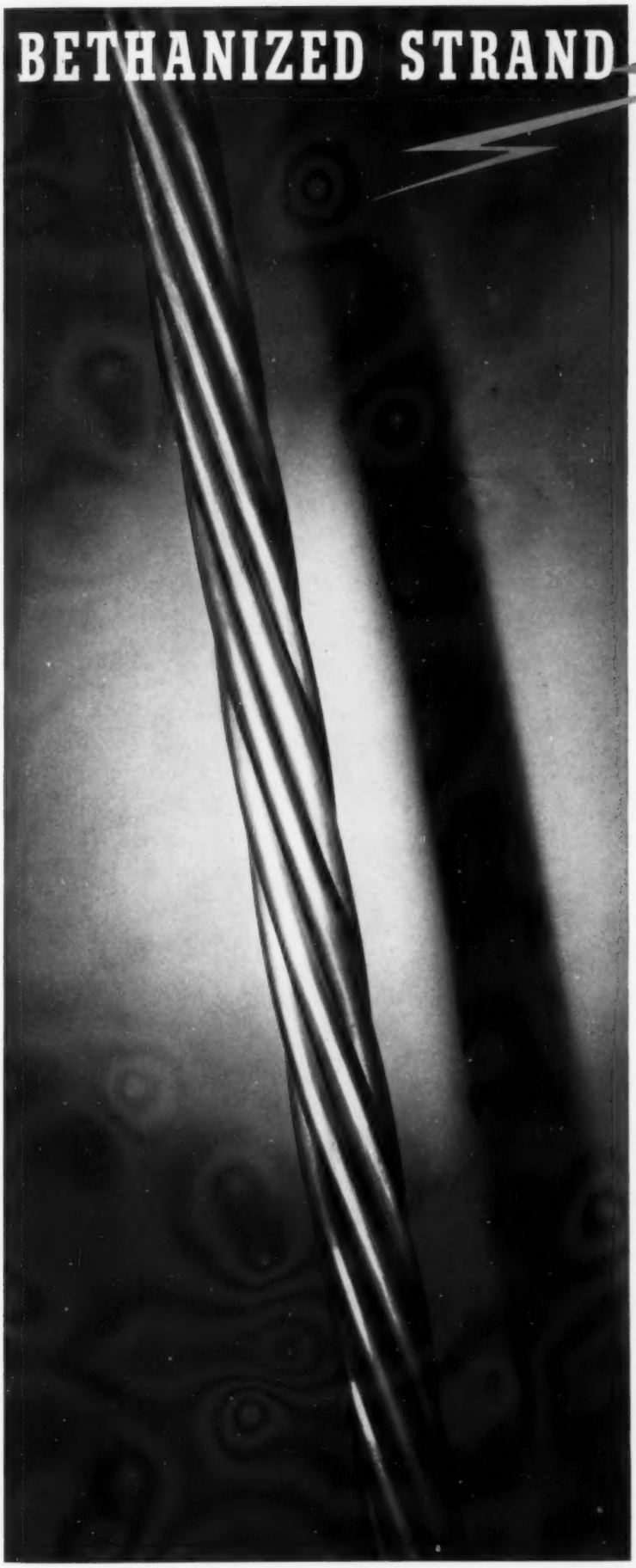
"I'm glad you called" is a familiar telephone phrase. These words become the headline of an advertisement which is reproduced on the opposite page. It appears in general magazines during December.

This advertisement, and many others like it, extend and interpret the spirit of service upon which the entire telephone industry is built. Such advertising should help to make friends and build business for the whole industry.

AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM

BETHANIZED STRAND

Electrically coated



. . . for heavier coatings

A.S.T.M. tests indicate that the service life of zinc coating is in proportion to the weight of the zinc. In bethanized strand, the coating weight can be varied to meet customers' requirements. Standard coatings are A (corresponding in weight to double or extra galvanizing); B (twice as heavy as A); C (three times as heavy as A). Even heavier coatings are available for special needs.

This range of coating weights is available in no other zinc-coated strand, nor can the same protection be equaled at the same price.

. . . for perfect uniformity

Obviously, a thin spot in zinc coating, or a coating which is off-center, shortens the life of strand. Only electrolytically applied zinc coatings are inevitably uniform. Bethanized strand is coated in this way. The zinc is deposited uniformly around each wire, regardless of the weight of coating.

Bethanized coatings are also uniform in respect to the zinc itself. All bethanized coatings are 99.99-per-cent-pure zinc. They are virtually free from any iron contamination.

. . . for higher ductility

Strand is always subjected to a certain amount of rough treatment in stringing as ground or messenger wire or installing as guys. The more ductile the coating is, the less likelihood that it will be damaged.

Zinc in a bethanized coating is in the most ductile form that can be commercially produced. Furthermore, since the zinc is bonded directly to the steel, without any brittle zinc-iron alloy between, it withstands bending or flexing without injury. Only an electrically coated strand has this toughness.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

In presenting the warmest Christmas greetings to their friends of the telephone industry, the makers of "Eveready" batteries repeat the prayer of the humble of the earth: "Good will toward men".

DECEMBER

TELEPHONE ENGINEER

MANAGEMENT
ENGINEERING
MAINTENANCE

Merry Christmas ~ ~ 1938

LAST CALL!!

FOR

1939 TELEPHONE "BLUE BOOK"

THE COMPLETE DIRECTORY OF MANUFACTURERS & BUYER'S GUIDE

TO SUPPLIERS SELLING THE TELEPHONE INDUSTRY:

The January—1939 BLUE BOOK offers you the outstanding advertising "buy" of the year. It carries your message to EVERY telephone company purchaser you wish to reach.

Every company should be represented in this "Who's Who" of Suppliers to the industry. Regular advertisers who realize the value of the BLUE BOOK ARE USING "extra space" as a major merchandising feature of their 1939 sales campaign.

Your listings in the BLUE BOOK will be "spotted" for prominence and assure you your share of 1939 orders.

BUT

TIME IS LIMITED—ADVERTISING COPY MUST COME IMMEDIATELY

Use the Blank Opposite to Order Space

Preferred Positions Are Allotted as Received

The January 1939 Telephone "BLUE BOOK" of TELEPHONE ENGINEER

Advertising Rates 1939 "Blue Book"

One page	7x10"	$110.00
Two-thirds page	4⅝x10"	82.50
One-half page	4⅝x7 or 3⅞x10"	60.00
One-third page	2 1/6x10 or 4⅝x4⅞"	45.00
One-quarter pege	3⅜x4⅞ or 2⅜x7"	38.00
One-sixth page	2 1/6x4⅞"	33.00
One-eighth page	2⅜x3¼ or 1¼x7"	22.00
One-sixteenth page	1¼x3⅜"	12.00

INSERT RATES ON REQUEST

The publishers of TELEPHONE ENGINEER are authorized to insert the advertisement of the undersigned to occupy.....page(s) in the 1938 BLUE BOOK, January, 1939, issue, copy for which will be furnished by January 5, 1939. Payment for space to be made at the rates above printed.

Dated .....19.....
Accepted

.....
For TELEPHONE ENGINEER

Acceptance of this contract is subject to approval of the management of
Telephone Engineer Publishing Company

Signed .....

Per .....

Full Address .....

City..... State.....

NOTE: Contracts for 1939 earn low term rates. Contract rate card on request.

Entered as Second-Class Matter, at the Post Office at Pontiac, Illinois, Under the Act of March 3, 1879.

***Then More Than Ever* — NATIONAL NICOPRESS SLEEVES and TOOLS Are INDISPENSABLE**

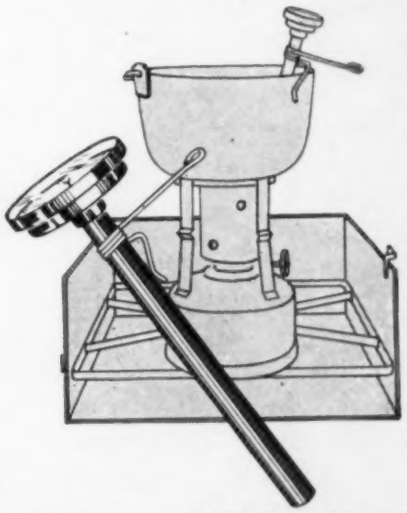
In times of emergency, when the lines are down and the men are working under strain and stress and the work of repair must be done quickly, then you'll find Nicropress Splicing Tools and Sleeves of tremendous practical value. For every lineman will make the splices quickly, easily and with least possible strain. The joints will have maximum strength and tightness and there'll be no pulling out of conductors. That's why many companies lay in a special supply of Nicopress sleeves that they hold in reserve for emergencies. It will pay you to order such a special stock and be prepared for the winter storms.

THE NATIONAL TELEPHONE SUPPLY CO.

5100 SUPERIOR AVENUE — CLEVELAND, OHIO

Export Distributor — International Standard Electric Corp., New York, N. Y.

CABLEMEN'S UNBREAKABLE THERMOMETER



A testing instrument embracing utility, stability, beauty and accuracy, for all purposes

Calibrated For Fahrenheit or Centigrade

Due to the scientific value of the DILLON TEMPEROMETER in determining temperatures, thereby increasing cablemen's efficiency in turning out dependable work, they are being placed in their kits as standard equipment, by the larger operating companies.

Price $6.00 F.O.B Chicago

Order through your Jobber, or direct to,

REGISTERS CORRECT TEMPERATURES OF—

- ★ Paraffine
- ★ Impregnation Wax
- ★ Compounds
- ★ Wiping Solder
- ★ Cable Damming Waxes.

DILLON MANUFACTURING COMPANY

63 East Lake Street — Chicago, Illinois

Standard Operating Features Available With NORTH "ALL-RELAY" Equipment

1. Dial Tone
2. Automatic Busy Test and Busy Tone.
3. Inductive Ringing Tone Indicating Called Party Being Rung.
4. Calling Subscriber Control of Connection and Instantaneous Release.
5. Message Register.
6. Overload Register.
7. Flat Rate Service.
8. Message Rate Service.
9. Paystation Service of All Types.
10. Cut-Through Toll Station Service.
11. Condenser Coupled Transmission Bridge.
12. Balanced Impedance Battery Feed Coils.
13. Ten Party Code Ringing.
14. Twenty Party Code Ringing.
15. Five Frequency Harmonic, or Synchromonic Ringing.
16. Combined Code and Frequency Ringing.
17. Ringing Trip Available During Ringing or Silent Period.
18. Special Alarm Features.
19. Test Panel Equipment.
20. Rapid, Secret, 24-Hour Service.

Toll Features

1. Loop Dialling on Physical Circuits.
2. Simplex Dialling.
3. AC Dialling.
4. Composite Dialling.
5. Through Toll Dialling.
6. Tandem Dialling.
7. Operator Control of Toll Calls.
8. Busy Verification for Toll Operator.
9. Free Service Blocking.
10. Restricted Toll.
11. Toll Grade Transmission.
12. Cordless Toll Boards.

Special Features Pioneered And Developed By The North Co.

1. Relay Selection Throughout.
2. Automatic Pre-Selection and Progressive Allotment of Idle Links.
3. Guard and Miscellaneous Circuits to Prevent Double Landings.
4. Line and Dialling Circuits Arranged to Compensate for Ground Leaks.
5. Universal Link Providing Service on Both Grounded and Metallic Lines.
6. Relay Type Selector for Systems up to 10,000 Lines.
7. North Self-Regulating Battery Chargers.
8. Wide Margins of Operating Safety with Respect to Dial Speed and System Voltage.
9. Line Lockout.
10. Directory Listing for Reverting Calls.
11. Unlimited Reverting Call Feature with Link Released During Conversation.
12. Conversation Time Disconnect.

and many others

The North Electric Mfg. Co. - Galion, Ohio

PIONEERS in the field of *"ALL-RELAY"*